AUG 15 1936

FOOD INDUSTRIES

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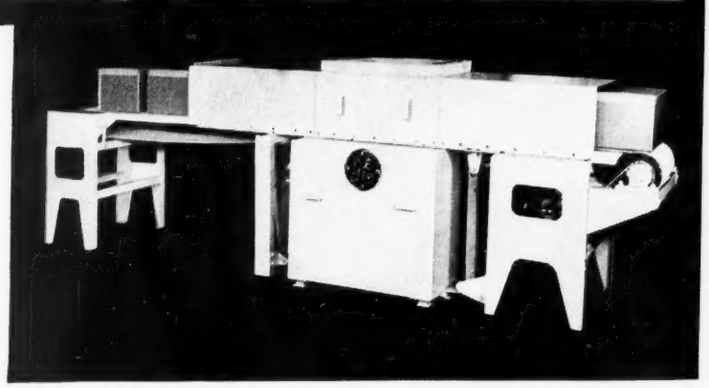

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GENERAL ELECTRIC X-RAY CORPORATION

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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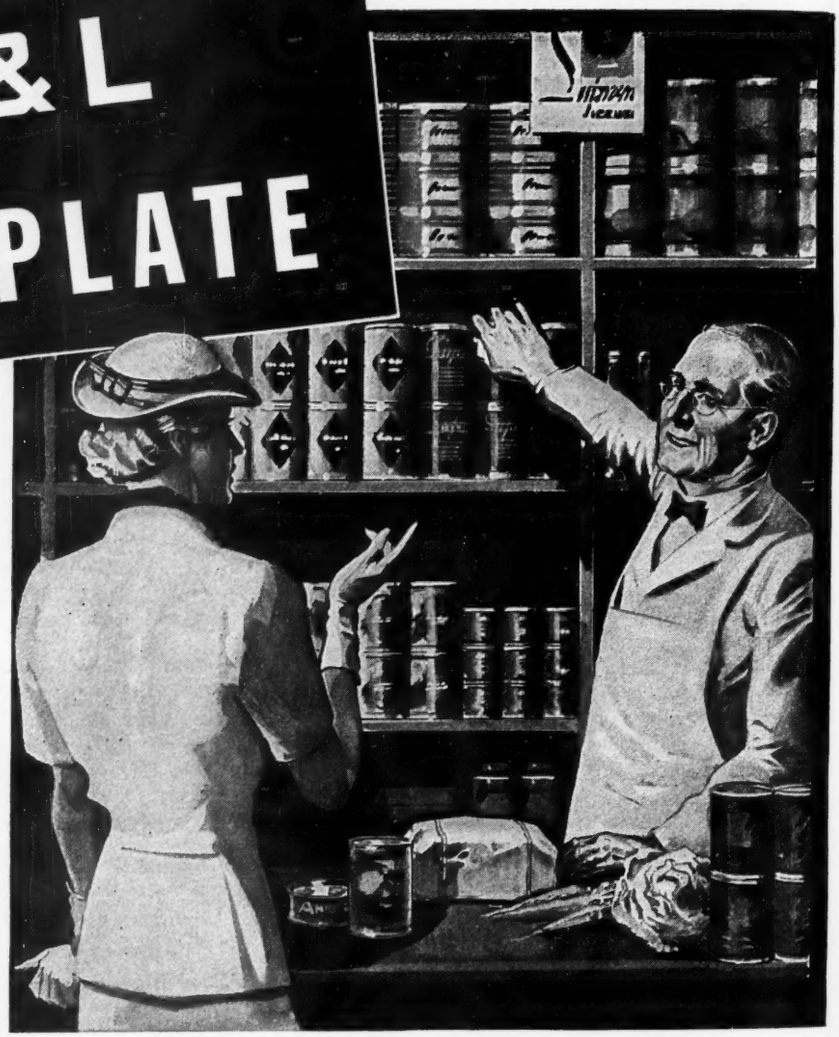

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Vol. 8, No. 8

Laurence V. Burton, Editor

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AUGUST 1936

THE TALK OF THE INDUSTRY

CONSIDER the problems of the United States Marshall in case No. 24,990 U.S. vs. 58 crates of blueberries. The blueberries were seized on August 1, 1935, because they contained maggots. On September 23, 1935 "No claimants having appeared, judgment of condemnation was entered that the product be destroyed."

After nearly two months in summer heat, what do you mean "product" and what do you mean "destroyed."

It reminds us of the seizure of some fifty pies in Gary, Ind., about fifteen years ago. After five months waiting for a claimant, the U. S. Marshall was ordered "to destroy" the pies. And the pies were not packaged in those days.

HOT WEATHER NOTE: One of the most fluent and uninterrupted flows of plain and fancy cussing that we have heard since the war greeted us in mid-July. The spark that touched off all this wrath was a meek inquiry as to the state of business.

Our informant was furious because on two consecutive extremely hot days he and three assistants in the wholesale milk business had been able to do nothing else but to explain to more than a thousand telephone callers that they could not have any more milk than they had already received.

"A hell of a sales manager, I am!" The demand for milk had been so great during the hot days that at one dairy the milk in tank trucks was pumped directly to the pasteurizers without going into storage tanks at all. This is a most unusual occurrence. And twelve big storage tanks in the establishment had nothing in them for two days.

Other food items in tremendous demand at retail food stores have been Coca Cola; Heinz' Consomme Madrilene; College Inn Tomato Juice cocktail. During the hottest of the weather in one eastern city many of these items could not be obtained after noon on any single day.

DEAH! DEAH!! Our sense of the ridiculous is getting us into difficulty. A British journal quotes from this page of our April issue under the dignified title of "Laboratory Notes." What do you suppose it was that attracted their attention? Nothing less than the Oklahoma proposal to package 5-lb. loaves of bread, hot from the oven, in vacuum containers 5 ft. long, to retail at 1 cent per pound.

Worse yet, we have received an inquiry from a serious-minded English food manufacturer for "fullest data available concerning the production, necessary plans, etc., along with addresses where one may get estimates and drawings for the erection of same in England." Also is requested the address where one can purchase a vacuum tin containing a loaf of bread for inspection.

HEALTH NOTE: If we receive any further letters like the following we shall be tempted to start a Child Welfare Department in this publication.

"We have noted in your pages that Gorton Pew Fisheries have a new lemon drop that contains vitamin B, cod liver oil and what have you.

"Please forward this letter on to this company and ask them to send me the name of their distributor in this territory or tell me where I can buy these lemon drops.

"I have worn out two razor strops and all the house slippers on the place getting the children to take cod liver oil during the past winter."

DESPITE the heat in our offices, 93 deg. F. to be exact, we cannot repress a chuckle over one of the statements recently made at a public conference by Dr. Homer P. Rainey. To most of our readers this name is probably a stranger. Right now he is Chairman of the National Youth Commission. Back in the days when we were in charge of a factory he was president of a small college in the same town.

One time he invited this department to become a part time professor of chemistry! The idea was that we were to sneak away from the factory job for a couple of hours per day. But

later he hastily withdrew the offer on the grounds that our views were entirely too liberal and besides we smoke.

At that time Dr. Rainey did much public speaking on the purpose of an education. "The purpose of an education" he said repeatedly, "is to enable one to deal masterfully with his environment." Contrast that with his July, 1936, statement that one of the major aspects of the youth problem is "a lack of jobs available."

To our way of thinking, the head of the National Youth Commission would do better to stick to his earlier philosophy. It would be much healthier advice to the youth of the land if the National Youth Commission would preach widely the need of self-reliance, the increasing need today of men who can start and carry on new enterprises, the imperative need for more men who really are able to deal masterfully with their environments. This is much safer than to coddle youth and make them softer by an official attitude that there is a lack of available jobs.

Opportunities to start new enterprises—one man enterprises though they may be—are just as great today as they ever were.

It takes brains, resourcefulness, new ideas, thrift and plenty of guts to create a new business. There has always been an alarming shortage of this type of man. That's why there are so many giant corporations. There aren't enough self starters and real managers to go around.

At any period in this country's history, it took just as much nerve and ability to start a new business as it does today. In this respect today is no different than yesterday.

Hors d'Oeuvres

• *About the time the Food and Drug Administration hit upon a means of detecting teaseed oil used to adulterate olive oil, teaseed oil had virtually been cleaned up in the Orient and the price was going up. So natural economic processes might have made the adulterant more costly than the olive oil and solved the whole problem for the government.*

• Heretofore just a laborious task, oyster shucking is to be made into a national sport. For benefit of publicity, the oyster industry will stage a shucking contest as a feature event of National Sportsmen's Show, in New York, Feb. 26. Shucks!

• *In case you ever wondered where Bock beer originated, here's what one authority has to say. Among medieval German breweries one known as Einböck was the most famous. Its beer, brewed only in winter, went to every European country and even to Asia Minor. The name often was pronounced "Einbock," and human laziness being what it is, this became plain "Bock."*

• College men are heavy milk drinkers, says Sealtest System Laboratories. Well, maybe so, but when we went to school men were men and coeds drank bootleg liquor too.

• *Financial reports need the dramatic vividness of the sports page, in the opinion of C. M. Chester of General Foods and N.A.M. May we suggest that its rather sporting to cut a large dividend melon.*

• In many cases, the appetites of famous men would be labeled gluttony were they lesser personages. Dumas was insulted if offered less than three steaks for a meal. Balzac consumed 100 oysters, a dozen lamb cutlets and a sole or two at a sitting. But don't feel inferior if you require only a ham sandwich for lunch. Isaac Newton lived on a scanty diet of bread, water and vegetables.

• *Domestic vintners should not complain too loudly about frequent changes in government regulations. South African Wine Growers' Association recently closed its New York office after being defeated in attempts to get into the American market by repeated issuance of new regulations.*

• National Biscuit Co. uses its noodle in promoting pretzels. By making them in the shape of the three-ring Ballantine-beer trademark, the company greatly increased sales, especially where that brand of beer was sold.

• *The first patent issued in America covered a process for the manufacture of salt. It was issued to Sam Winslow in 1641 by the Colony of the Massachusetts Bay. In those days inventors never knew whether they would receive patent rights or be burned at the stake for witchcraft.*

The so-called civilized nations of the world are getting soft plenty fast enough without official, paternalistic education in how to become soft. It comes dangerously near to a New York wisecrack about studying to be a moron.

Is 1913 Weather Repeating in 1936?

OUTSIDE of the perplexities arising from the Robinson-Patman law, the biggest problem before the food manufacturer today is the drought.

What will it do to markets? What will it do to raw material supplies? How much longer will it last?

According to the recent theory of Dr. C. G. Abbot, the weather repeats itself every 23 years. If this be true, then 1936 weather should be a repetition of 1913 weather.

We have consulted the old records and briefly here is what happened in 1913. In northern states, January and February were not as cold as in 1936. But there were tremendous floods in the Spring. The biggest was the Dayton Flood. Then came a very serious drought. It became apparent in June, 1913. In July, it was worse. In August, 1913, it was still worse. Even official records bemoaned the calamity. The drought was not broken until autumn.

If many of our readers request it we will publish a review of 1913 weather and 1914 weather. It's a terrific job and we have plenty of other things to do. Hence any requests to be convincing must tell us why the job should be done. And at least 200 requests will be needed before we will tackle it.

Need for More Rigid Control

PRODUCERS of frozen foods are overlooking a big bet if they trust to luck on matters of quality. If the frozen food is to be cooked immediately after defrosting, a few bacteria more or less may not make a whole lot of difference.

However, if the frozen food is an industrial raw material, to be melted and used in an uncooked food, the presence of excessive numbers of microorganisms present may be a matter of very serious technical importance. In a number of cases it has led to fermentation and spoilage.

This word of caution applies in particular to certain frozen ingredients used in industrial food manufacture. Rigid quality control is absolutely

necessary. Several cases have come to our attention that spell nothing else but a permanent loss of business. Quality control is a cheaper guarantee of volume than high powered salesmen.

Package Development Laboratory

EVERY food company regardless of size, ought to have some technically-trained individual in the organization who will concentrate on protective packaging problems. Where the concern is of medium size or larger, it ought to have a properly equipped special laboratory to be placed at his disposal for the development of better protective packages.

Such a department or function is nothing more than one of the necessities for doing business. And it is just as important as any other department.

Ethylene For Tomato Products?

EVERY manufacturer of tomato products has often faced the problem of improperly or poorly colored tomatoes. The usual remedy is to raise the devil with the growers, demand strict adherence to contract specifications (if management has any backbone). Out of all this perennial controversy has developed the new system of buying raw materials on a graded basis that is slowly taking hold.

Ethylene ripening of whole tomatoes has been suggested from time to time but has not proved, so far as we know, to be a satisfactory solution of the problem of unripe fruit. But, of late, we have been wondering if gaseous ethylene in intimate contact with pulped raw tomatoes could have any beneficial effect? And if it should have a demonstrably good effect, would it act rapidly enough to do any commercial good were it to be forced into pulped raw tomatoes under high pressure in a closed pressure vessel? Perhaps a little sugar would need to be added before the gas treatment.

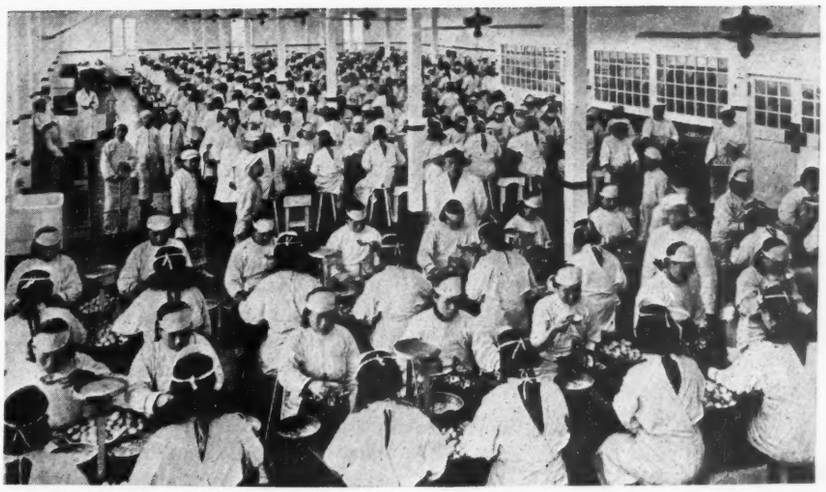
The idea appears to us as deserving of a few small-scale preliminary tests to see if it has any merit for, if successful, it might lead to a method of standardizing color of tomato products. On the other hand it may turn out to be a crackpot idea.

"Less Work for Mother"

AS fine a statement of the real function of the food industries as we have ever seen has been published by N. W. Ayer & Son, Inc., of Philadelphia. It appeared recently as a three-page advertisement in *Printers Ink,* bearing the title "Less Work for Mother, and Better Food For All." Its contrast of 1935 with 1895 is stimulating.

In these days when uninformed and biased minds are charging that there is too much advertising and too much stress on brands, it is refreshing to hear this calm comparison of *now* with *then.*

Unfortunately, however, most of those who are biased and uninformed are too young to remember 1895. Less than half the people of this nation know a thing about the Nineties. The majority can remember nothing about ordinary existence prior to 1900 because they were not yet born. It would do them good to read this story that tells how far we have come.



Henningson Produce Company, Shanghai, China, has a plant that is up to date and largely equipped with American machinery, according to York Ice Machine Company. This plant produces frozen eggs, employing 600 girls in this department who break about 1,000,000 eggs per day.

Any Takers?

BACK of the following incident there must be a strange story. One wishes he could learn the whole truth about such a food law violation as a recent case reported in Notices of Judgment, Food and Drug Administration. This case was U. S. vs. a number of jars of pickles which were seized because of short volume; ambiguous declarations of the quantity of contents; sodium benzoate undeclared or in excess of the amount declared; misleading impressions created by the label; and two lots which were adulterated with saccharine.

For a wonder, there was no alum present. Usually a concern that goes haywire that far, will go all the way. With sodium benzoate we have no quarrel. Our only comment is that, in foods of a quality good enough to build an increasing volume of business, it is seldom needed in the temperate climates.

Saccharin, whether permitted by law or not, has a disgusting sweetness. Its use in a food doesn't make sense.

And bum labeling, carried out in a city where there is a branch of the Food and Drug Administration, where authoritative advice on the law is easily available, well—that doesn't make sense either.

What we should like to know is: Was the manufacturer ignorant, driven to it by a tough buyer or just plain dumb?

We are tempted to wager a "spitless" cigar against a package of Luckies that the man who is responsible for such an absurd concoction was a German political refugee just arrived in this country. Dozens of them have called at our offices. Each was imbued with the idea of entering the food business. And practically everyone of them brought over a ton or so of some "harmless food preservative" or some unusual "food flavoring" that would reduce costs.

Vitamin H

ANOTHER vitamin has been added to the alphabetical list during the past month. The newcomer is vitamin H which has been separated from Vitamin G concentrates by Dr. Lela E. Booher of Columbia University. A diet deficient in vitamin H when fed to a rat resulted in a growth of only one-sixth normal size and finally death.

Except for I and J, vitamins from A to K are now known.

First Patman Law Action Likely to be Against Big Company

EVER since June 19, when the law which *Printers' Ink* calls "The Patman-Robinson Monstrosity" was enacted, there has been a great rush to get aboard the band wagon. Everybody has been trying to don garments of lily-white sanctification.

Such expressions of commercial piety that have been uttered publicly have come from the larger, and consequently most vulnerable, corporations. Smaller concerns, though equally bewildered as to the real meaning of the law and its future implications, are adopting a "Stop, Sit and Listen" attitude. Which is to say that nobody knows what it is all about, but that only the big boys are doing the real worrying about it. The little fellows, for once, indulge in a dream that they have been given a break.

Everybody knows that the first tests of the enforcement of the law will be against some big corporations. It is hardly to be expected that any proceeding, under the new powers granted to the Federal Trade Commission, will be taken against any small concern. Nobody believes that under this hastily enacted measure there will be a repetition of procedure under the late and lamented NRA. Do you remember how they put a little New Jersey tailor in jail for pressing a suit of clothes at 5 cents under the code price, while at the same time failing to press any action against first-class fighting outfits such as Weirton Steel Co. or Houde Engineering Co.?

CURRENT belief is that whatever action, if any, is to be taken under the Robinson-Patman Law will be against a he-man corporation of the first magnitude. And hence the very evident rush to acquire spotless commercial garments of the larger sizes.

When the wholesale grocers sought to protect their position in the markets of trade by special legislation they started something. Nobody seems to know where it is going to end. At the time the law was going through Congress nobody paid a whole lot of attention to it. It seemed to be so fantastic that it could not pass. It looked like a lot of other proposed legislation that goes into the hopper of the congressional mill every year and never emerges. Legislation of this sort is often introduced as a courtesy or a sop. Yet at the last minute it was jammed through, hastily written, ambiguous, contradictory and so full of loop holes and exceptions that nobody, who by training and experience is really qualified to interpret a law, cares to say what it really means.

In general, it seems to have been created with the purpose of saving the wholesale-independent retailer type of merchandising and distribution from the severity of the competition offered by the corporate chains. Yet the feeling is growing in many places that the sponsors of the law have unwittingly slipped a noose about their own necks. Some of the extreme pessimists are of the opinion that if the new law is enforced vigorously there will be very few small wholesale grocers left in the United States at the end of five years.

Such a fate for the sponsoring groups would be ironical indeed. Yet it would parallel the outcome of much New Deal legislation. Too often the most recent laws have had the effect of penalizing the very persons these laws were intended to benefit. A case in point is the AAA. A Hoosier farmer, trying to make a living on a "Buttermilk Forty," once told FOOD INDUSTRIES that, through the effect of the processing tax on shorts, he was required to pay from $2 to $3 a month toward rewarding a bigger farmer for producing less wheat.

A curious feature of the new law is that it goes far beyond the expectations of the sponsoring wholesale grocers. It has caused the Goodyear Tire & Rubber Co. to abrogate its contract with Sears, Roebuck & Co. In the toilet goods, drygoods, and drug fields the effect has been similar to the problems of the food manufacturer. Similar state laws have been responsible for certain large oil refining companies selling all their retail outlets to others with the result that the oil companies are now making more money than ever before.

Even manufacturers of supplies such as bottles and tin cans, labels and cases are having their troubles in deciding what they must do to comply with a law that even their own lawyers do not understand.

And the only happy thing about the whole mess for the rank and file of food manufacturers is that there is every expectation that only a big company will be selected for the first test case. For once there is a source of distinct satisfaction in being too small to be a national advertiser, in being too small to attract much attention, in being in a business that is wholly intra-state.

NEVERTHELESS, to those who are optimistic enough to believe that some real good must ultimately come somehow out of a reform measure of this kind, there is a chilling note in some of the interpretations of the new law. For example, the Institute of Distribution points out ". . . the competition of the big buyer may be injured by withholding from him the savings due to his methods of buying, and if this is done he is discriminated against unlawfully."

Thus, according to this interpretation, the big distributor which approaches a small or medium sized manufacturer would have a legal right to demand a better price than that accorded to a small buyer.

Furthermore, if the big buyer can claim and prove discrimination he can collect treble damages.

Such an interpretation of the possibilities under this law is obviously not in accordance with the intent of the sponsors of the Robinson-Patman law. They had just the opposite purpose. The idea was to give the small wholesaler and the independent merchandise broker an opportunity equal to that of those associated with chain stores—in fact, to give him just as much as could be written into a law and still have it constitutional.

Several different bills were introduced embodying the same general purpose, but with different wordings and slightly differing legal technique. Yet all of them constituted an amendment to the old Clayton Act. During the latter days of the last Congress parts of the various bills were collected together and finally voted on without any noticeable effort to reconcile any conflicts of statement or to clarify the ambiguities. It is regrettable to be forced to admit that the duly elected representatives of the people of the United States would enact such a hodge-podge of legislation, and it is further regrettable that the President signed it without delay when he could have ascertained by the briefest study that it is largely incomprehensible.

IN the light of all this what is a manufacturer to do? Obviously he will not shut up shop. He cannot be expected to alienate all his biggest customers. Yet here is a legal monstrosity that has teeth in it. Its criminal section can fine a man or send him to jail. A violation can be made the basis of a successful claim for treble damages. It became a law the minute it was signed —not after some period of time elapsed. It has been a law since June 19, 1936. It is now in operation.

One thing is certain. Manufacturers will consult their lawyers as never before. Every single contract must be carefully scrutinized. Another certainty. Cost accounting in selling must be done with meticulous care. Sales departments must be able to know costs—not merely guess at them. Nobody can ever know when he will be called upon to prove that a sale or a purchase was not a discriminatory one.

The safest principles to follow until the law has been interpreted by the courts are: to treat everybody alike; to stick to published price lists; eliminate all "front office deals;" overhaul and revise the accounting procedure as it pertains to merchandising and selling; and to determine what is the most economical size of order.

Certainly it looks very much as if orders and shipments are going to be larger than before. The new law seems to mean that each order must carry its proportionate part of the selling costs.

To sell a small order at too low a price is just as much of a discrimination against a big buyer as selling a big buyer at a price that is too low is a discrimination against a small buyer.

Since every self-respecting lawyer and association is bringing forth a host of contradictory interpretations, we feel that our readers will not be injured if we fail to contribute further to the tumult.

The building in the center of this picture is the famous No. 100 Hudson St., New York City. Most of its tenants are food brokers who may be somewhat affected by the Robinson-Patman law.

Four Kinds of Trouble Avoided By Using Less Water

By L. V. Burton
Editor, Food Industries

▶ ***There can be at least four good sound reasons for economizing on water. And three of them have nothing to do with the water supply. This article, and its companion next month, will apply to:***

Brewers
Canners
Corn Products Manufacturers
Dairies
Meat Packers

LESS WATER is used to process one case of goods in a plant at Holcomb, N. Y., than in any other canning plant I have ever seen. The factory has a water supply that is ample for every need. There is no occasion to stint on any use for water. Five million gallons is always in reserve right on the factory grounds. This amount of water is enough to run the plant for at least three weeks. Yet a gallon of water goes ten times as far in this plant as it does in the average factory in the same line of business anywhere else.

Some manufacturers argue that they must have lots of water. But they often overlook the fact that every gallon of water pumped into the factory means a gallon of sewage—liquid industrial waste—to be disposed of.

If there is plenty of cheap, fresh water and, likewise, if it is easy to get rid of the waste, it's all very well. You can have every gutter and drain in the plant running like a river—if you like it. You can have a cascade of water like Niagara Falls at the outlet sewer—if you want to pay for it. But, to do all this, three things are necessary.

1. A huge supply of fresh water.
2. Factory drains of ample capacity.
3. Adequate disposal facilities.

Once I visited a factory where everything was okay from the standpoint of No. 1 and No. 3. But they were God-awfully shy on No. 2. It was a brand new plant, not over three months old. It ought to have been well-nigh perfect. But there was water, ankle-deep, over half the floors.

The trouble was that the drains were not a quarter large enough. Somebody had miscalculated.

In this new factory it was necessary to build a temporary rough wooden sluiceway across a large room to carry off a young river that was running about 500 gallons a minute. Duckboards were laid everywhere to keep the workers up out of the water.

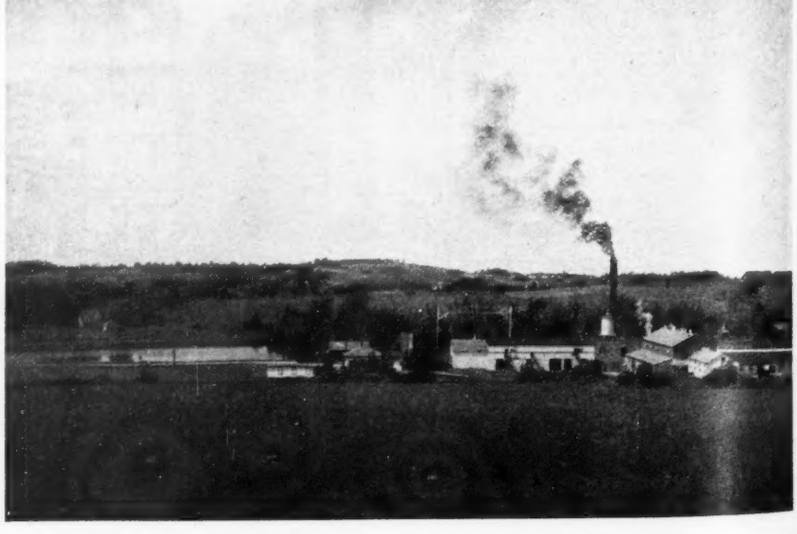
Some real water economy would have helped a lot. To put in adequate drains after the floors were all in, meant that they would have to cut over 400 ft. of ditches in a concrete floor 16 in. thick. A heart-breaking job. Very expensive. And ruinous to an otherwise perfect floor.

More recently I have seen another plant located right next to a lake of the finest water one would ever want to use. The water is so good that the town uses it for the city water supply. And that means that the factory is not allowed to dump anything into the lake.

If the factory should need as much as 50,000 gallons a minute, the lake could supply it. Furthermore, the factory drains are plenty big. Each one could carry three times the amount of water that was in them and they are very generous of water at this place. My best guess is that they use about 1000 gallons of water a minute.

However, all of this water must be disposed of. It has to go somewhere. And in this town it has to go to the city sewers. The lay of the land will not permit any other method of disposal.

So, when the factory was first built, they cut into the nearest municipal sewer. This was a fairly small tile, for the plant is located at the edge of



Note the huge reserve of 5,000,000 gallons of water always available. Yet this plant of the W. N. Clark Co. has a remarkable water economy.

the town nearest to the lake. And promptly the huge volume of extra water backed up sewage into every house and store for several blocks at this part of the town. It almost caused a riot. And it created plenty of enemies.

THE next move was a rush to construct a special 24-in. sewer *at factory expense* to carry the waste water to the nearest municipal trunk sewer. It remedied the situation all right. But the special sewer was over 1,800 ft. long and was 10 ft. deep. And it cost a lot of money. Pavements had to be cut and relaid.

A sound application of water economy might possibly have saved the cost of the extra sewer. But a big lake right next to the factory was a temptation to use lots of water. Apparently nobody ever thought it possible to use less water. So they had to build a bigger sewer.

Probably this is the best way out of the difficulty because it offers a permanent foolproof system. But it is a most unfortunate event unless the company is better heeled than most food companies.

A further reason for water economy is found in the character of the stuff that gets into the sewage. Sometimes it is very costly to treat it in such a way that it will not become a nuisance if it is dumped into a river. Some liquid industrial wastes from food plants cause so much trouble and expense that municipalities refuse to take on the burden of treating the waste at public expense. They force the problem back onto the factory itself.

Some state conservation commissions also can slap a fine on a company that is polluting a stream. Such fines run anywhere from $50 to $200 a day, each day constituting a separate offense. Usually the creek or river is large enough to carry away the volume of water. That is not the cause of the trouble. It is when the stream stinks to the high heavens, or when the fish die, or when cattle refuse to drink it, that the offending food company may get into serious and expensive trouble.

It's a very profitable food plant that can stand a fine of $200 a day for very long and not go bankrupt.

A few years ago some of the plants that make sugars, starches and syrups out of corn had plenty of trouble with their liquid wastes which were mainly "steep water"—water in which the corn is steeped or soaked. The law was hot on their trails. Eventually the discovery was made that, if the waste was kept concentrated, the cost of the manufacturing process was considerably reduced. Patents were applied for. Two of the biggest companies sued each other for patent infringements. However, from our present viewpoint, it was only a case of one more reason for water economy that proved to be rather profitable.

The small stream of water at the far end of this revolving sewage screen is all the water that goes to the sewer. Plant was in full operation when the photo was taken.

Then there is a fourth reason—the possible need to economize on water where the supply is ample and dependable as long as the factory stays within reasonable amounts. This happens to be the case at Holcomb, N. Y. On a hill about two miles away are several springs of splendid water. Never, since that region was first settled, about two centuries ago, have these springs ever gone dry. The volume is constant. The water is good. All that is necessary is to use no more water than the springs produce and keep a big storage reservoir filled at all times to take care of sudden demands.

BY ADOPTING special arrangements in the factory there is plenty of water for every operation. There is no need to skimp. I spent a day and a half studying the place and its methods. For hours at a time, the outlet sewer ran a stream no bigger than a man's wrist. I could hardly believe my eyes. Yet the management assured me that it was the only outlet sewer for the whole plant. I satisfied myself that this was true.

THEN I went back into the plant and watched the operations again, I satisfied myself that I could not have done a better job if I had been in full charge myself. And I would not have needed any more water than they were using at the time. Yet this plant pumps in only one gallon of fresh water compared to about ten gallons of fresh water that other plants would have pumped in if they were doing the same work. The point is that they are using just as many gallons of water per operation as anybody else. But they use it over and over again. And if the water is still clean, cooling water for example, they run it back into the reservoir and use it in the cycle again. How all these water economies have been worked out will be told in detail in another article next month.

The main thing right now is to realize that there can be at least four good, sound reasons to economize on water. And three of them have nothing to do at all with the amount of water available.

In the September number the way in which the plant at Holcomb, N. Y., carries out its remarkable water economy will be described, together with a water "flow diagram."

Atmospheric Control Reduces Costs and Improves Quality

MANY valuable results are obtained in the fermented beverage industry by atmospheric control. Correct temperatures are, of course, the most important. Dust removal from the air is also very important, for dust will carry bacteria and wild yeast that may contaminate and ruin the product.

Also there is the matter of removal of carbon dioxide from the air in fermenting rooms. Then there are certain kinds of brewing plants where the rate of air movement is very important. This occurs in fermenting cellars, where too fast or too slow a movement of air across the top of open tanks affects the quality of the goods produced.

Furthermore, there are very definite economies of operation that can be made. Money can be saved and troubles avoided by well engineered installations. A proper tie-in of atmospheric control with good common-sense practice will permit these better methods of operation.

When a kettle of beer is first brewed it is called wort. Its temperature is at the boiling point. The wort must be cooled down to a suitable temperature before fermentation. The older practice in the U.S.A. has been to cool it by pumping the wort over Baudelot coolers, or through tubular heat exchangers. Part of the coils are water cooled. The final cooling is done by refrigerated brine pumped through the bottom coils of the cooler or heat exchanger. The first cooling requires huge quantities of water which must be bought or pumped. Then this water must be disposed of. Either it is wasted, or used for other services in the plant, or it can be cooled by spraying and then re-used.

Atmospheric control has made it possible to use less water and make a better product. Some plants are now using the wort cooling method known as the "cool ship" for the first stage of the cooling. A "cool ship" is a large shallow tank completely fitting the bottom of a big room. Sterile dust-free air is blown across the surface of the hot wort. The wort cools, from 212 deg. F. to about 140 deg. F., by evaporation of about 3 per cent of its water.

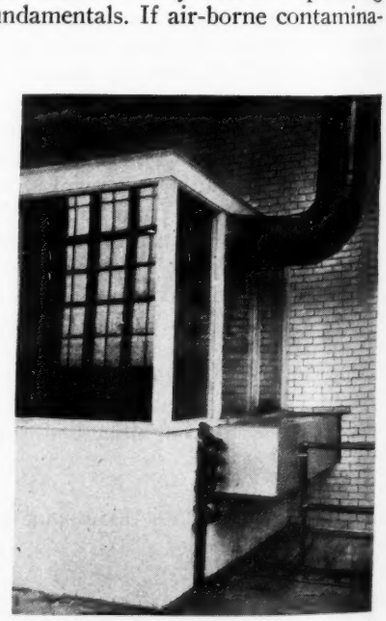
This evaporative method of cooling would be absolutely impractical without atmospheric control. Unless the air is filtered clean, the blowing of such a huge volume of air across the surface would contaminate it so heavily that the quality might be ruined.

The air must be partially dehumidified or otherwise on hot, muggy summer days, very slow evaporation would occur. Consequently cooling would be delayed. And production would be held back at the very time when demand is greatest. The dehumidification can be easily done with a unit cooler which will partially "dry" the air.

At one plant, the Enterprise Brewing Company of Fall River, Mass., where the foregoing method is employed, the next step in wort cooling is passing it through a tubular heat exchanger which in turn is cooled by well water. In this equipment the wort is cooled from 140 deg. F. down to about 60 deg. F. By taking out 70 deg. of heat in the "cool ship," the amount of well water needed for cooling is roughly cut in half, compared to what would be required if all of the cooling were done in a tubular cooler. Thus it permits economizing on water and avoids wastage of any possible surplus warm water after it has passed through the cooler. The cooling temperatures can be regulated so that no more water need be used than can be efficiently utilized by the other plant services which take the outflow from the coolers.

However, even after the wort comes out of the cooler at 60 deg. F., it is still too hot for fermenting. Next it is cooled on Baudelot surface coolers of the dairy type. The wort is on the outside and the refrigerated brine on the inside. This cooler is located in a glass enclosed room exactly like the rooms used in dairies to enclose milk coolers. Furthermore, it is enclosed for exactly the same reason.

But brewers know more about avoiding bacterial contamination than do most dairymen. In fact, dairymen could learn a whole lot from brewers. Probably this is because boards of health don't often pester the brewers. Therefore, the brewer's attention is not turned away from operating fundamentals. If air-borne contamina-



Outside view of cooler room. The lower duct is for incoming twice-filtered air. A large copper duct carries the moist air up to discharge point on the roof. Dairies should follow this practice.

▶Every form of physical atmospheric control is used in breweries, all the way from dry air filters and unit coolers up to complete air conditioning.

In particular, freedom from bacterial contamination permits better quality control and the use of more economical methods than otherwise would be possible.

The methods and reasons described here are particularly applicable to

Breweries
Dairies
Meat Packing Plants
Yeast Plants

Controlled

tion gets into milk it usually means that the milk will not keep sweet quite as long. But if the same contamination gets into beer, it almost always results in a huge financial loss.

So, in the Fall River plant, the glass enclosed room is not only very tightly constructed, it is also ventilated with double filtered air. The air is forced through two separate sets of filters. This form of atmospheric control is very important and is very closely supervised by the laboratory. The final result is sterile wort cooled to around 40 deg. F., ready to be pumped into the fermenting tanks.

In the fermenting cellars, aging cellars and subsequent departments, the cooling is all done by unit coolers instead of the old style bunker coils. Atmospheric control here is primarily to maintain correct temperatures. The Enterprise Brewing Company regards such dehumidification as occurs, where unit coolers are used, as merely an incidental effect. In their case, the reasoning is based on the fact that they brew beer. An ale brewer, however, would require complete air conditioning in his fermentation room.

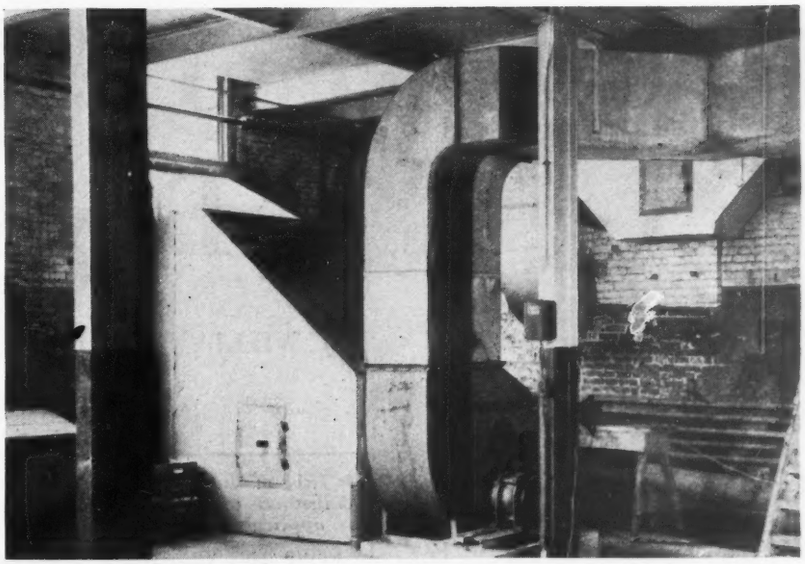
The dehumidification which occurs incidentally at the Enterprise plant is, however, of some real benefit. Fermenting cellars and storage cellars are always dry enough so that they can be painted any time after one night of operation of the unit coolers before the day crew spills water on the floors in the morning. Under the former method of cooling with bunker coils they were forced to save all of the painting jobs until the plant could be shut down in the winter time.

Another advantage of the use of unit coolers is the saving of time in defrosting of bunker coils. They regard the time saved as equivalent in value of the cost of power consumed in operating the fans in the unit coolers. Obviously no more refrigeration is used for cooling the fermenting cellars by one system of cooling than by the other, for the demand is based on the amount of heat leakage into the room.

Controlling the atmosphere in an ale brewery is a somewhat more elaborate job. The requirements for good operation are much more exacting, particularly in the fermenting room. A well-operated ale brewery requires complete air conditioning in this department.

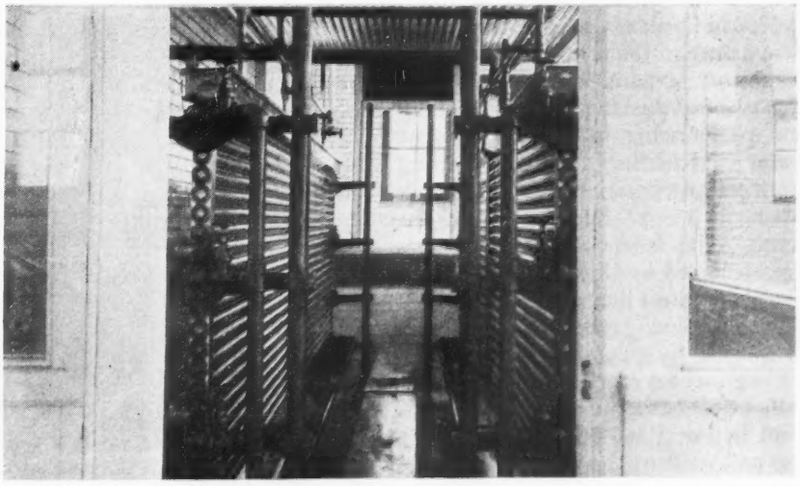
Take Feigenspan Brewing Com-

(*Turn to page 433*)



Air intake, fan and filters. Sterile filtered air, an essential part of this plant's operation, goes to the Baudelot coolers and to the "cool ship."

This room is the "cool ship." The perforated copper box at left is the hop strainer. Walls and ceilings are covered with sheet aluminum arranged so that condensate cannot fall back. Cooling and aerating take place here. Filtered air is essential.



Dairy equipment in a brewery. This Baudelot cooler is in a glass enclosed room ventilated by twice-filtered air. Note the corrugated aluminum ceiling built to prevent possible drip back into the sterile wort. Photo taken during clean-up.

Atmospheres

How to Keep Ceilings Dry In Winter

By WILLIAM A. DEAN, JR.

Engineer,
Bowman Dairy Co., Chicago, Ill.

GETTING rid of excessive moisture in the air is a serious problem in many types of food plants. Its presence is particularly troublesome during the winter months when condensation takes place on the ceilings, and, in some cases, on the outside walls.

In planning our milk bottling plant in the River Forest suburb of Chicago, we took steps to avoid excessive humidity by increasing the capacity of air to take up moisture and to hold it until the air could be removed from the plant by ventilation. We do this by heating the cold air drawn in from the outside and by raising slightly the temperature of the recirculated inside air.

Our efforts have proven successful. However, they involved more than the mere heating of air. This heated air had to be distributed through the operating areas so as to make certain that it came in contact with the moisture-laden air before that air was chilled to its dewpoint and caused a fog near the ceiling and condensation on the ceiling and walls.

IN a milk plant, most of the excess moisture in the air gets there as the result of: general sterilization with steam, can washing, bottle washing and pasteurizing in certain types of water circulating units. During sterilization operations, large volumes of steam escape into the air of the room. This is so because small parts are sterilized by direct application of live steam until they are much too hot to be handled. Also, pipe lines are sterilized by passing live steam through them for several minutes. All of this steam must be taken up and held by the air. Otherwise, the ceiling and walls of the room will become dripping wet.

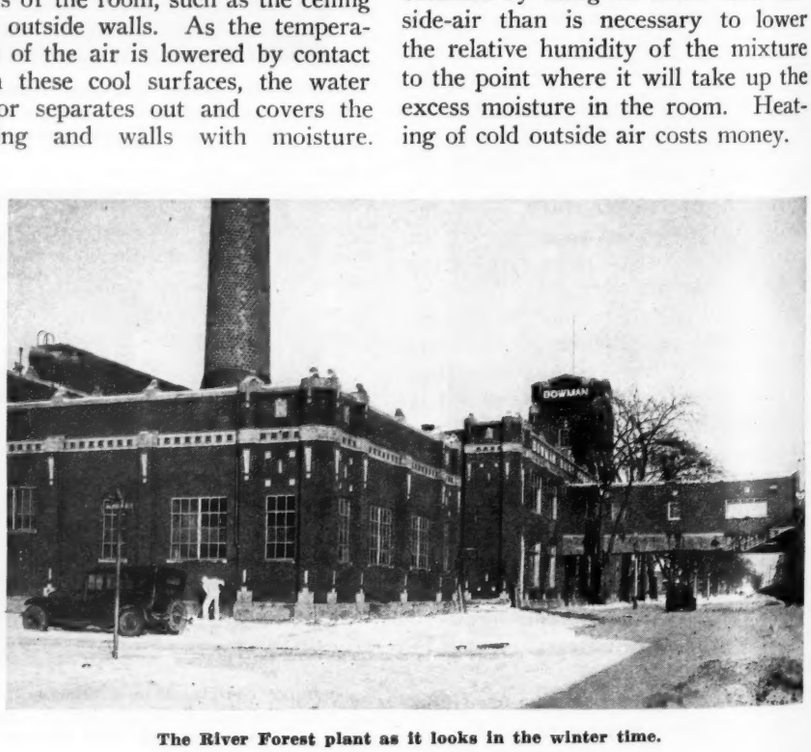
As we all know, steam and heated air, if left to their own movements, will rise in a room. Cold air will come into the room through doors and windows and stay close to the floor until it begins to warm up. As it rises in temperature, it will take up moisture from the wet floor, expand in an upward movement and take up additional moisture from its surroundings. In addition, this upward movement of air carries the moisture vapor and steam towards the cooler parts of the room, such as the ceiling and outside walls. As the temperature of the air is lowered by contact with these cool surfaces, the water vapor separates out and covers the ceiling and walls with moisture.

This method of preventing condensation of moisture on ceilings is applicable to:

Fruit and vegetable canning
Ham and frankfurter boiling
Ice cream making
Milk and beverage bottling
Open kettle cooking of all kinds

The important feature in our dehumidification system is that we reverse the normal upward movement of this moisture-laden air by forcing heated air into the room at the ceiling; this warm air takes up the steam and excess water vapor and prevents condensation. To do this, we installed a centrally located blower which pulled into the system the desired proportion of moisture-laden inside air and cold outside air. This mixture is forced over fin-type heating coils and through ducts to discharge vents in the ceiling of the affected room.

The ratio of outside air to recirculated inside air is regulated by dampers and varies according to the relative humidities of the two atmospheres. Economy of operation is obtained by using no more cold outside-air than is necessary to lower the relative humidity of the mixture to the point where it will take up the excess moisture in the room. Heating of cold outside air costs money.



The River Forest plant as it looks in the winter time.

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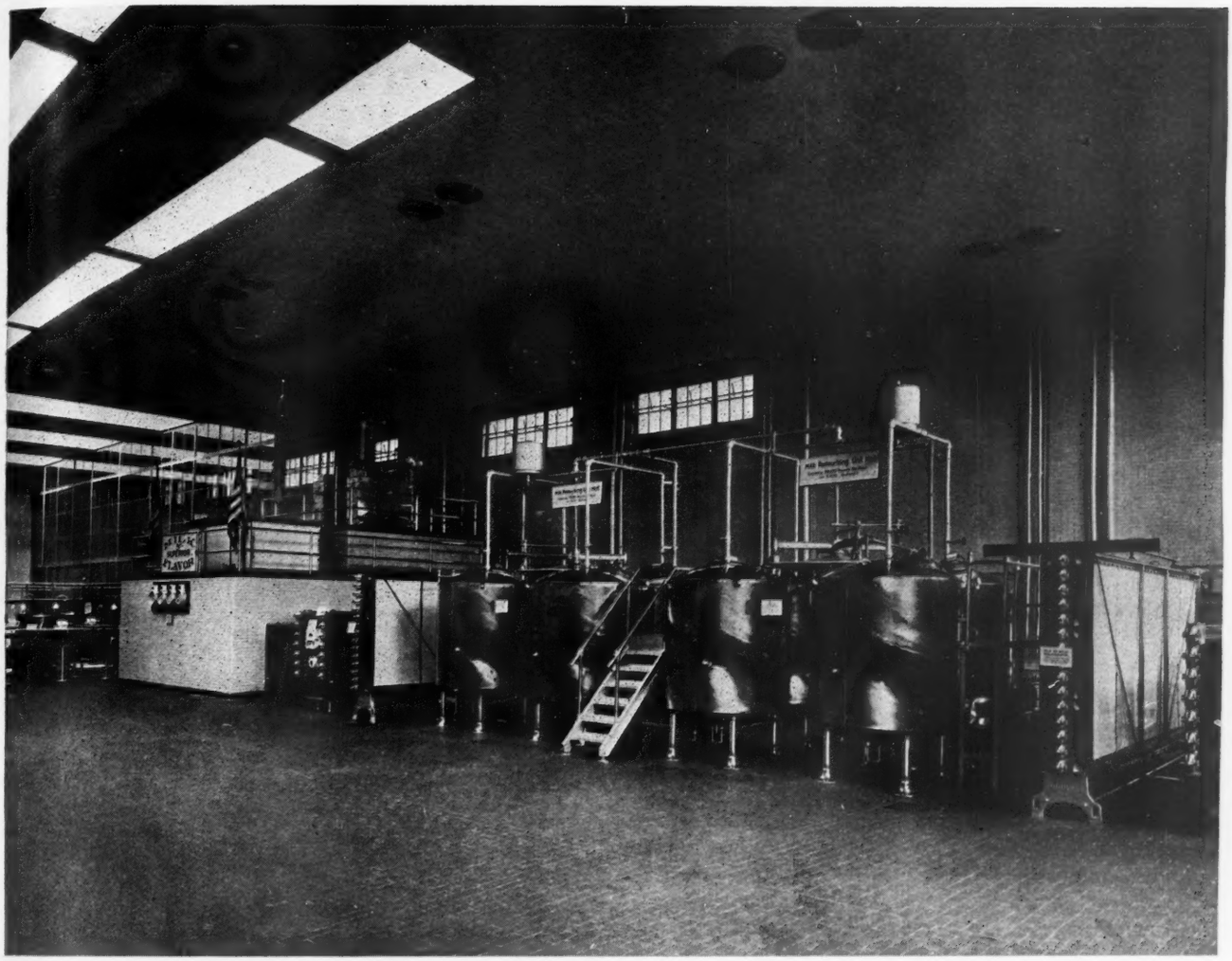


Heated air is forced into the room through the square openings in the ceiling. Although it does not show, there is also one in the glass-enclosed bottle-washing section.

The room which we equipped in this manner is 143 ft. long, 60 ft. wide and 26 ft. high. In it are storage tanks, pasteurizing equipment, milk coolers and bottling machines. The bottle-washing section is behind a glass partition, shown in the background of the interior view. That section contains two automatic, soaker-type bottle washers. One of the discharge vents is in the ceiling of this section.

EQUIPMENT needed to get the desired results are: (1) a No. 9 S.W. Buffalo Forge Co. blower driven by a 10-hp. four speed electric motor and with capacities of 8,000, 15,600, 20,800 and 28,000 cu.ft. of air per min.; (2) 30 sections of Reed air filter to filter both the air drawn from the outside and that recirculated, and (3) six sections of Areo-Fin copper heating coils.

In operation, the fan pulls air from both divisions of the room through grilles in the sides of the cooler platform. These are seen at the left center of the room view. The fans also draw air from the outside through a duct opening in the outside wall. This air mixture is then forced through the air filters to remove all suspended solids, such as dirt particles. After filtering, the air passes over the heating coils to be brought to the desired temperature before it is forced through ducts to square openings in the ceiling of the room. There are five of these openings, two of which may be seen in the illustration. The opening in the bottling-washing section is similar to the ones shown in the picture. The other two are near the other side of the room over the storage-tank area.

The heated air is admitted at the ceiling rather than near the floor because: (a) the downward flow of air opposes the natural rising of the moisture-laden air and prevents this air from rising to the ceiling; (b) the heated air, which is low in relative humidity, comes in contact with the rising moisture at a higher temperature than if it were admitted at the floor. This means that the moisture is taken up more readily than if the heated air were at a lower temperature and its relative humidity correspondingly higher.

AS stated previously the humidity in the room is controlled by the proportion of outside air to the recirculated air. If the humidity of the mixed air is found to be too high to take up the moisture of the rising air, more outside air is drawn into the system.

The results of our efforts have proven very satisfactory from an operating viewpoint. Visitors with technical experience frequently comment on the excellent atmospheric condition we have.

Researches That Made Gas Storage Possible

PART I

By NEIL R. FISK*
London

▶*Gas storage, as carried out in England, has an important bearing on the future of:*

Meats **Eggs**
Fruits **Nuts**

ALMOST all the scientific investigation which has been conducted with a view to prolonging the preservation of meat, by storing at low temperatures in inert gases, is of very recent date. Haines,[2] records that, apart from the work of Brooks and Hansford,[3] who carried out experiments on the rate of growth of various molds, very little information concerning the growth of micro-organisms on chilled and frozen meat was available as recently as 1931.

There are four main subdivisions of the problem. They are:

1. Effect of cold on micro-organisms
2. Effect of cold on meat
3. Effect of gases on micro-organisms
4. Effect of gases on meat

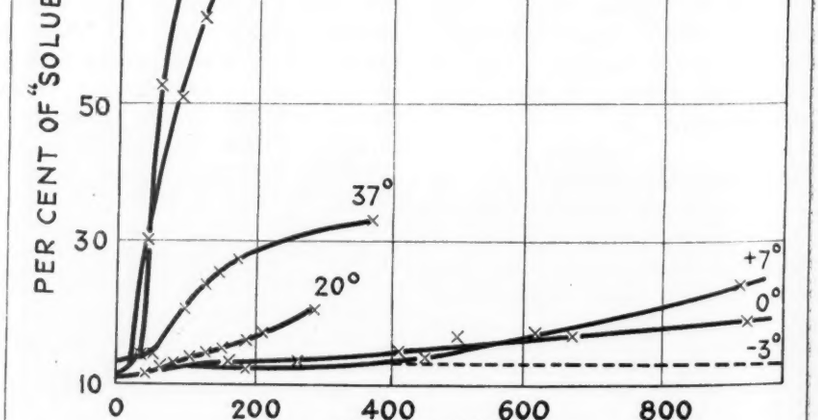
It is obvious that in practice these conditions will be closely interrelated; e.g., the effect of cold and of gas on meat will be largely, though not entirely, due to their effect on micro-organisms present in the meat. Combinations of these factors are, therefore, most frequently encountered. And in the gas storage of chilled meat, we are, of course, concerned with the combined effects of cold and of gas on meats. The development of this work has been such that "gas" means today, for all intents and purposes, carbon dioxide. But work carried out with other gasses will be described briefly for completeness.

IN "A Note on Taint Production in the Fat of Chilled Beef," C. H. Lea[4] states that oxidation of the fat of chilled beef stored in air does not normally occur unless the meat is exposed to strong light, but under the conditions of storage for very long periods, made possible by the use of CO_2., oxidation may occur. Bleached, whitish patches occur, usually where the fat-covering is thin or the meat has suffered bruising. These patches have never been observed on strips of fat stored in desiccators in the laboratory for similar periods of time. The discoloration is due to the conversion of oxyhaemoglobin to methaemoglobin followed by bleaching of the yellow fat pigment, and it seems to be connected with oxidation, since bleached fat always had a higher oxidation value than adjoining fat of normal appearance.

This discolored fat has a tallowy odor and after a longer period acquires an oily flavor which is not, however, considered to be as objectionable as the bitter flavor of fat tainted by micro-organisms. Consequently, deterioration in the flavor of the fat of chilled beef, apart from the action of micro-organisms and the accidental absorption of odors, may result from oxidation if the meat has been stored for a very long time.

There are few or no bacteria in healthy flesh at death. In a careful experiment described by Moran and Smith,[5] it was found that three days after death the total bacterial count in one of the thigh muscles of a steer was 190 organisms per gram of muscle. After a further fourteen days at 41 deg. F., this figure increased to 237. The corresponding figures for a cow were 776 and 3,146 organisms per gram of muscle.

Bacteria on meat are mostly confined to the surface and are picked up during slaughter and dressing from the gut, hoofs, hide, wash water, and so forth, and during subsequent handling. Experiments have shown that careless handling can reduce the merchantable life of meat from eighteen to seven days under the conditions of the experiment. When bacterial infection has proceeded so far that the meat is covered with an unpleasant smelling slime, the number of bacteria present is of the order of



Rate of breakdown of meat proteins under influence of bacteria. (From Journal of the Society of Chemical Industry, 50, 226 T. 1931.)

* Mr. Fisk, as former assistant editor of *Food Manufacture*, has closely followed this development in the storage of meat. His review of the scientific literature will continue in several brief monthly installments. This is the first.

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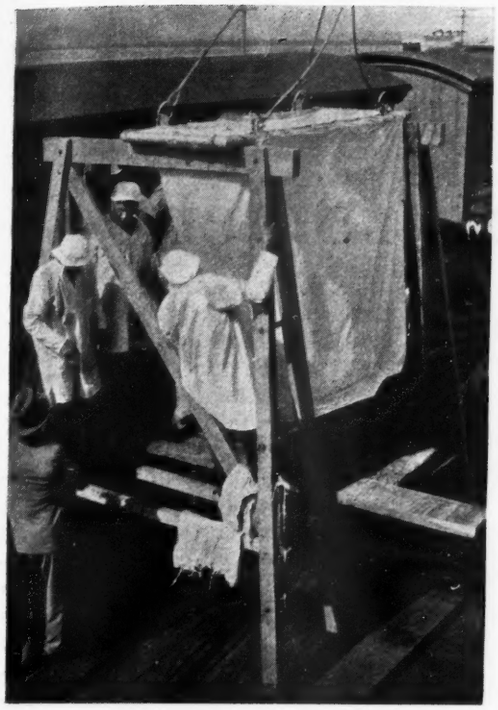

When meats are handled at Townsville, Australia, a "shirt" is put around the hoisting rack to avoid possible contamination. It reduces number of bacteria and prolongs storage life.

30 million per sq.cm. of meat surface.

A considerable amount of study has recently been carried out in Australia with a view to finding out the more important factors involved in the spoilage of meat and with the aim of "cleaning up the slaughter houses." Improvements which have been introduced include frequent sterilization of the knives and other instruments coming in contact with the meat, the provision of adequate washing facilities and clean overalls for the men engaged in the various operations and a regular and thorough cleansing of the slaughter floor and chilling rooms. As in so many cases, however, the mental attitude of the worker is of supreme importance, and a further point often overlooked is adequate space for working.

In an article entitled "Control of Mould Fungi in Dairy Factories and Meat Works," Neill [6] gives an account of detailed laboratory experiments on the control of fungi commonly found in these situations. Prescott, Hale and White,[7] in an article, "Observations on the Bacteriology of Slimy Beef," state that superficial development of micro-organisms on beef in cold storage was, in the particular case investigated, due to a practically pure culture of a bacterium capable of growth at temperatures slightly above freezing point especially in the presence of high humidity and insufficient air motion.

Factors affecting the color of meat have been described by Benedict[8] who compared spectrophotometrically, the intensities of light reflected diffusely from various cuts of meat in the region 500 to 700 μ. Reports of an early experimental shipment of chilled beef to Great Britain were given by Schutte,[9] who records the London reports on the shipment.

"Observations on the Bacterial Flora of some Slaughter - Houses" by Haines,[10] gives an account of a preliminary survey, the sources of heaviest contamination being indicated. Another article by the same author[11] shows the bacterial flora developed on stored lean meat, particularly "slimy" meat, to be chiefly organisms of the *Achromobacter* types. The characteristics of 120 strains of this organism are described.

Finally, an article on the bacterioscopy of meats was written by Breckenfeld [12] in 1934.

Effect of Cold on Micro-organisms

Molds are perhaps chiefly responsible for the spoilage of meat. Those most commonly found on cold-stored meat are *Thamnidium chaetocladiodes, T. elegans, Mucor mucedo, Cladosporium herbarum, Sporotrichum carnis, Penicillium expansum* and *P. anormalium.* The first is the one which seems to be mainly accountable for the growth of "whiskers" on chilled meat.

It is probable that certain organisms are responsible for specific odors and taints in fat. Lea [13] has shown that if conditions during slaughter and dressing are satisfactory and humidity during storage is below a certain critical value, meats such as beef and mutton can be stored for as long as 60 days at 0 deg. C. without appreciable deterioration. If these conditions are not realized, however, spoilage may occur due to the action of either bacteria or molds, or both. Kraay and Wolf [14] have shown, and Haines [2] has confirmed that *Pseudomonas fluorescens* can cause splitting of fat and lecithin.

Haines [2] investigated the breakdown of meat protein by bacteria at various temperatures by incubating finely minced fresh beef in flasks at various temperatures with optimum conditions for the initial growth of bacterial flora. He found that a temperature of 0 deg. C. was not sufficient in itself to inhibit bacterial multiplication, considerable changes (up to 7 per cent in less than 40 days) in "soluble nitrogen" being found. It has since been confirmed that this result applies equally well to the storage of meat in carcass form. In regard to the latter, *it is of paramount importance to regulate the conditions of humidity, more particularly the rate of evaporation of water from the meat. A dried superficial layer is, as might be expected, less favorable to the growth and spread of bacteria.* (See Fig. 1.)

THE great variation in the rate of breakdown of different samples in the experiments incubated at 37 deg. C. is probably to be explained by differences in the initial contamination at the slaughter house or during handling.

It has been found that the best procedure for carcasses which are to be held in a chilled condition during transport is to cool them immediately after slaughter to a temperature of around 0 deg. C. The growth of bacteria is thus slowed down. And there results, moreover, a diminution in the amount of soluble nitrogenous material produced by autolysis which would serve as food supply for the bacteria already there or collected later.

In the next installment will be reviewed the researches showing the effect of cold on micro-organisms responsible for the deterioration of meat.

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Atmospheres

Vacuum Cooling Solves Production Problem

By E. S. STATELER
Associate Editor, Food Industries

▶ ***With the help of vacuum cooling bakers put bread and cake cooling on a definite schedule basis. Other industries in which this unit operation might be used are:***

Fruit drying
Fruit juice freezing
Meat smoking and packing
Poultry packing

VACUUM COOLING is a relatively new unit operation in the field of food manufacture, and is not widely used. In fact its use in food processing has been little known outside the carbonated beverage and fruit industries until the past few months. Now forward-looking members of the baking industry are giving it a try as a solution to one of their most troublesome problems; that of putting the cooling of their freshly baked products on a definite schedule basis regardless of weather conditions.

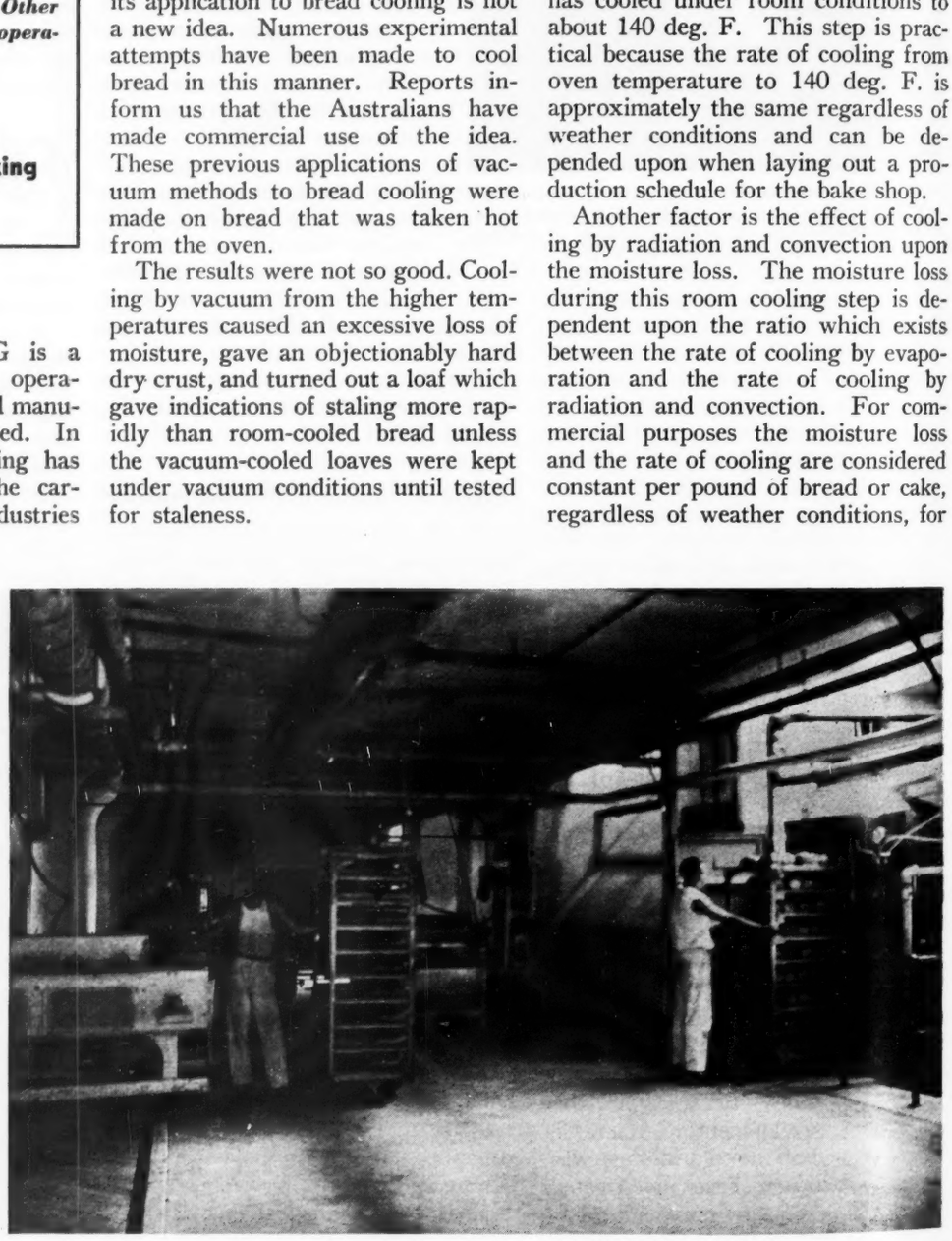
It appears to be meeting the test. Less than a year ago two baking concerns were using it only in an experimental way. Today about twenty vacuum cooling units are in commercial operation in bakeries with new installations under way. Some of the largest baking companies have placed units in each of their several plants after giving the method a trial in a single plant.

In practice the method depends upon the cooling effect obtained by rapid evaporation of water. This engineering principle is a familiar one. Even its application to bread cooling is not a new idea. Numerous experimental attempts have been made to cool bread in this manner. Reports inform us that the Australians have made commercial use of the idea. These previous applications of vacuum methods to bread cooling were made on bread that was taken hot from the oven.

The results were not so good. Cooling by vacuum from the higher temperatures caused an excessive loss of moisture, gave an objectionably hard dry crust, and turned out a loaf which gave indications of staling more rapidly than room-cooled bread unless the vacuum-cooled loaves were kept under vacuum conditions until tested for staleness.

According to the latest procedure the bread or cake is not subjected to the vacuum-cooling operation until it has cooled under room conditions to about 140 deg. F. This step is practical because the rate of cooling from oven temperature to 140 deg. F. is approximately the same regardless of weather conditions and can be depended upon when laying out a production schedule for the bake shop.

Another factor is the effect of cooling by radiation and convection upon the moisture loss. The moisture loss during this room cooling step is dependent upon the ratio which exists between the rate of cooling by evaporation and the rate of cooling by radiation and convection. For commercial purposes the moisture loss and the rate of cooling are considered constant per pound of bread or cake, regardless of weather conditions, for



At the Ward Baking Company plant in Newark, N. J., the vacuum cooling unit is made a part of the production line so that the cooled bread can be taken directly to the slicing machine.

the range of temperature between which the bread comes from the oven (about 210 deg. F.) and 140 deg. F. The cooling period ranges from about 35 to 60 minutes depending upon the weight of the loaf.

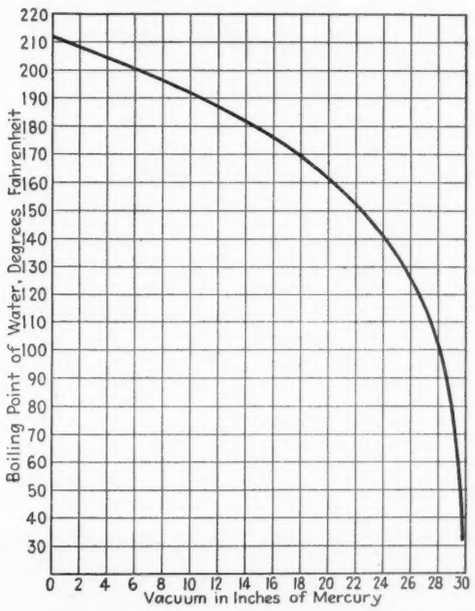
At 140 deg. F. the loaves are subjected to the vacuum-cooling operation about four minutes for a fully loaded rack. During this four-minute period sufficient moisture is drawn from the loaves at 28 1/3 in. vacuum to cool them to 95 deg. F. The total moisture loss during the entire cooling cycle is ½ oz. per lb. of bread. This moisture loss is considered as being the same as though atmospheric cooling were used to get the bread to the desired 95 deg. F.

In this way a 4-lb. loaf of restaurant bread is cooled ready for slicing and wrapping in about an hour regardless of weather conditions and without a heavy capital expenditure in air-conditioning equipment. During the recent exceptionally hot days as much as six hours would have been required to cool a 4-lb. loaf to 95 deg. F. by atmospheric cooling, providing the entire cooling period did not come during the hours that atmospheric temperatures were above 95 deg. F.

This method of applying vacuum cooling to bakery products is covered by U.S. Patent No. 2,021,772 issued Nov. 19, 1935, and several other process and apparatus patent applications. The significant claim in the issued patent reads, "A method of cooling bread which comprises a first step of cooling the bread to a temperature between 130 deg. and 140 deg. by radiation and convection, and a second step in which the bread is subjected to pressures substantially less than that of the atmosphere."

The equipment by which the vacuum-cooling operation is carried out consists of a vault having inside dimensions slightly greater than those of a standard bread or cake cooling rack, a shell-and-tube condenser, and a motor-driven vacuum pump capable of pulling a 29-in. vacuum.

AS built by the Vacuum Bread Cooling Corporation, 205 East 42d Street, New York, N. Y., the vault is of reinforced steel construction and coated on the inside by a corrosion-resisting paint. It is fitted with a one-lever closing door whose rubber-gasketed face is brought securely against the face of the vault opening and held there by the inclined-plane action of the lever until the pump has reduced the inside air pressure to less than atmospheric. As the suction increases the rubber-gasket is compressed. In this way the lever pressure drops to zero and the lever falls to an "open" position. With the lever in an "open" position the door will automatically spring ajar when the vacuum-cooling cycle is ended.



With a curve such as the above as a guide an operator can readily decide what vacuum to apply to cool his product to the desired temperature.

Provision is made for the unobstructed movement of the wheeled cooling racks into and out of the vault. This convenience is accomplished by adjustable double-acting lever-type hinges and by a cantilever-acting threshold at the vault entrance. The hinges permit the door to swing completely out of the passage-way leading into the vault. As the door swings open a roller block on the door, riding on a taper block, causes the threshold to rise automatically to form a smooth approach from the floor of the plant to the floor of the vault. A special locking device keeps the door from swinging into a partly closed position. When the door is released for closing, the threshold automatically lowers to give the door clearance. This design, among others, is the subject of apparatus patent applications.

Across the top of the vault and conveniently above the height of a cooling rack is a baffle-plate which allows the moisture vapor to be drawn out of the vault when suction is applied but prevents any condensate in the head space of the vault from dripping back onto the bread or cake on the cooling rack.

Suction is obtained by a motor-driven water-cooled pump mounted along one side of the vault. The pump may be of one or two-stage construction depending upon the load it is to carry.

Through solenoid switch connections the pump is under automatic electrical control for timing and operation. The time indirectly determines the amount of suction to be applied. This limit is set by a manually-adjusted time switch. In cases of emergency the system can be operated manually.

Successful operation of this method of cooling depends upon the vaporization of a definite weight of water during the time period desired to bring the bread or cake to the desired temperature. This is another way of stating that a definite degree of vacuum must be obtained in the vault if the products are to be cooled to the desired temperature in the predetermined time period. This accomplishment is dependent upon rapid condensation of the water removed from the bread or cake being cooled. Here is where the shell-and-tube condenser plays its part. As long as the temperature of the water supply is below 75 deg. F. a definite schedule of production performance can be obtained.

THE entire floor space occupied by the installation measures approximately 8x10 ft. Each cooling rack has a capacity of approximately

COOLING by the use of a vacuum is explained by the fact that water vaporizes at temperatures below 212 deg. F. when the pressure is reduced below that of the atmosphere. For instance, when a 29 in. vacuum is maintained, water will vaporize at 79 deg. F.

When water vaporizes, it absorbs heat. And, in the equipment described in this article, the only place that the heat can come from is from the bread, which is thereby cooled.

600 1-lb. loaves of bread or 150 loaves of 4-lb. restaurant bread. As many as nine racks of bread can be handled through the vault in an hour. This performance gives a production rate of approximately 5,000 lb. of bread per hour. When handled in this manner the vacuum-cooling operation may be correlated with that of the ovens to meet definite delivery truck schedules.

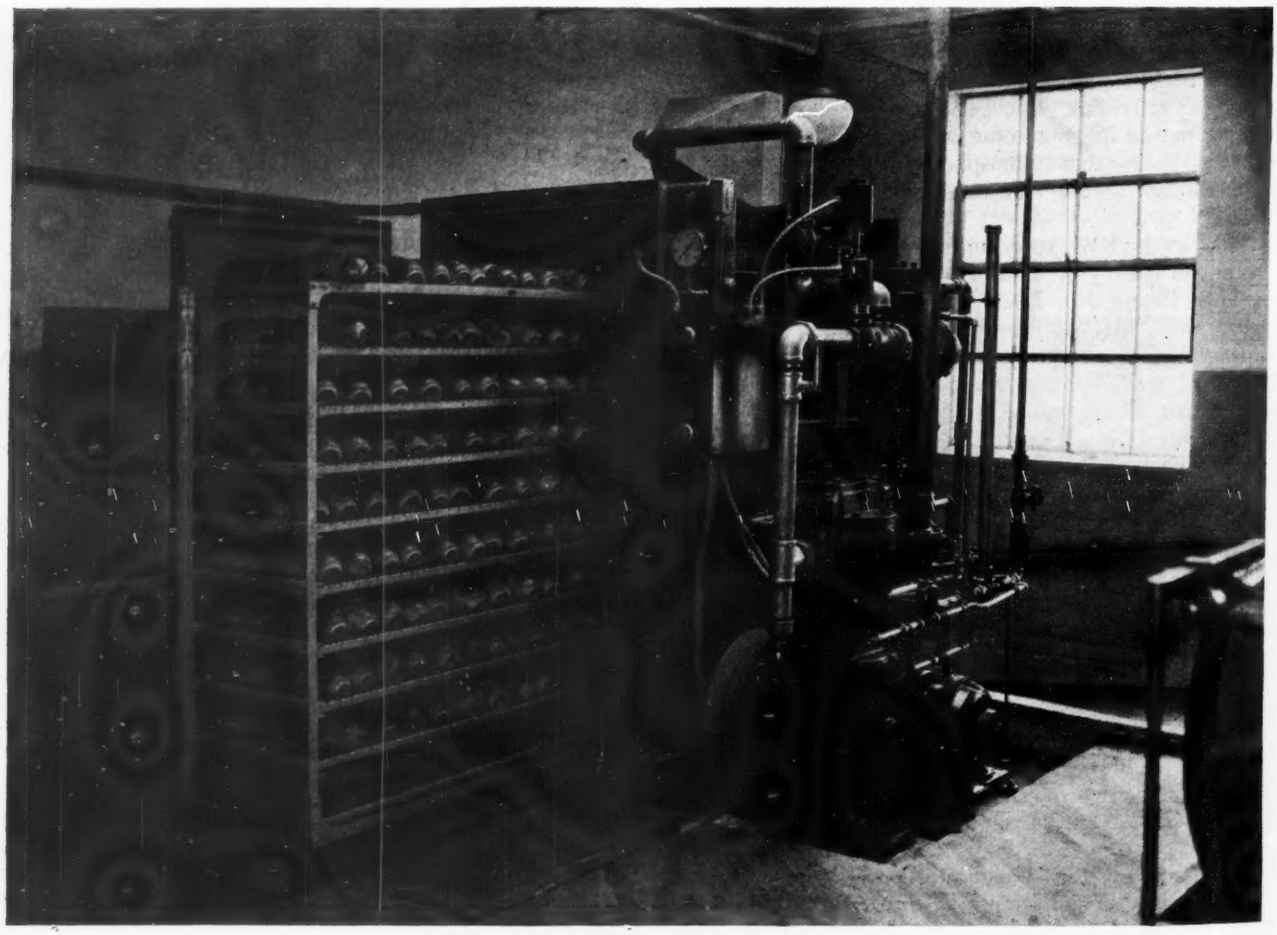
The utility of this method of cooling is not restricted to any size or weight of product. Its value for cooling all forms of pan and hearth bread, and smaller products such as rolls, has already been demonstrated by installations made in a number of large bakeries.

IN its Brooklyn plant the Great Atlantic & Pacific Tea Company has been using this method of cooling bread for nearly two years. Campbell-Taggart of Kansas City has used it for more than six months. Ward Baking Company began several months ago with its Providence, R. I., plant and is now rapidly adopting this method of cooling bread and rolls in its several plants as fast as the installations can be made. Gottfried Baking Company, New York City, has been using this method of cooling for its restaurant bread, English muffins, 1-lb. pumpernickel, and doughnuts for several months. The Kingston Cake Company, Kingston, Pa., has found the method highly satisfactory for cakes, especially for pound cakes.

With this method of cooling all baking companies can extend a rigid schedule of operations from the mixing of the sponges or doughs to the delivery of the finished product to their retail outlets. Also, instead of having to provide cooling space for 40 or more racks of bread, provision now needs to be made for only about nine. When atmospheric cooling was depended upon during hot weather, an entire day's run would be likely to be on the floor cooling before the slicing and wrapping machines could be started. Now packaging operations can definitely begin after the first rack of bread or pound cake has been out of the oven an hour and can continue uninterrupted to finish the day's run one hour after the ovens have stopped.

For muffins, rolls, doughnuts and the like, the cooling operation can be started immediately after the baking and the goods can be packaged within a few minutes. This sequence of operations means an appreciable shortening of the time lag between the ovens and the consumer. It also enables the production manager to keep all his plant operations under schedule control, and does away with the necessity of carrying over from the previous day a sufficient quantity of bread or cakes to meet emergency or short order demands.

Production men using vacuum cooling say that it gives them better control over the crust texture of their products, makes their packaged muffins and sweet goods less likely to mold, and gives products a longer "fresh" period in their retail outlets.



Locating a vacuum cooling unit is not a matter of grave concern as it can usually be fitted into almost any 8x10-ft. space near the slicing and wrapping department. The installation shown here is operating on rye bread, a hearth product. The cooling units can also be used for all other types of pan and hearth breads, for small goods such as rolls, and for cakes, doughnuts, biscuits, English muffins and all other forms of baked goods.

Paradoxes of Quality Control

I *Cream Can Be Kept Too Cold*
II *Adding Lactic Acid Bacteria to Milk to Maintain Flavor*

By M. E. Parker
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EVEN though men have known how to make butter from the days of the earliest civilization, new facts about butter are constantly being discovered. Some of the more recent discoveries are really not as novel as they might appear to be upon first sight. As a matter of fact, the novelty arises in the ability to define by scientific means what the trade has long recognized but could not adequately explain.

To anticipate Mr. Ripley, believe it or not, it seems to be possible to keep cream too cold for its own good. Investigations at the University of Illinois have shown that the value of cream for butter making can be injuriously affected if the cream is cooled to too low a temperature and kept too cold so that upon its delivery to the creamery it lacks the proper acidity.

Of course, this does not mean that cream should not be cooled. But it apparently means that clean cream will make better butter when it is kept between 60 and 70 deg. F. than it will when it has been kept warmer or cooler.

THE CONTROL of cream quality by temperature will soon be studied exhaustively at every agricultural experiment station throughout the middlewest. And the indications are that it will be of vast economic significance to both cream producers and creamery butter industry.

The truly amazing thing about these recent developments is that the fundamentals of practice involved have long been known and established. Every good butter maker recognizes and appreciates that the delicate flavors and aroma which characterize fine butter are attained only by "ripening" the cream with "starters." In other words cream is invariably and deliberately *soured* before churning. This is done by inoculating it with an active culture of lactic bacteria and incubating, or holding, it for a definite time. It is probable that many individuals (who are not butter makers) do not realize that so-called "sweet cream" butter is made from cream which has been soured by means of desirable acid and flavor producing bacteria. In fact, much of the "sweet cream" butter produced in this country is made with starters.

The practice of ripening cream with starters might be called "controlled souring." In the normal souring of clean cream, lactic acid is formed, also a variety of other products which are present either in small amounts or as traces. While the principal end product is lactic acid, there are also to be found other end products. These include carbon dioxide, hydrogen, acetic acid, with traces of propionic and possibly butyric acid. Along with these end products there is also produced varying amounts of diacetyl, acetyl methyl carbinol and 2-3 butylene glycol—the last two named having no perceptible odor. Diacetyl is the aroma that characterizes fine butter, and it is found present in concentrations of from 0.05-0.5 parts per million, in mild flavored butter, up to as high as 2-4 parts per million, in highly flavored butter made from ripened cream of high acidity.

These end products of the normal lactic fermentation of clean cream have their individual characteristics all of which contribute to the flavor of the butter. When the fermentation is normal, and nothing else takes place, the flavor of the butter is pleasing. But sometimes it happens that one or more of these end products appear to be present in abnormal amounts, or else other products having undesirable characteristics develop. When such is the case, it invariably can be attributed to improper conditions of temperature or age, or both.

Carbon dioxide is present, dissolved in milk as it is drawn from the cow, to the extent that, if in free gaseous condition, it would occupy a volume equivalent to 10 or 15 per cent of the volume of the milk itself. Hydrogen is known to be a gas that is particularly effective in preventing oxidative influences. Carbon dioxide will also prevent oxidation. This fact is well known to food manufacturers.

Acetic acid is, of course, the acid responsible for the sour taste of vinegar. It is volatile and aromatic. And it is found in appreciable quantities in all good quality fermented milk, including the so-called commercial buttermilk sold by most modern dairies.

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▶ ***These two obscure factors affecting quality control are of primary interest to all industries using milk. But they have also an important secondary meaning.***

If anything, they mean: Take nothing for granted. Question everything.

Butter makers presumably know all about these fine points of quality control. Others who should know about them are makers of:

Butter
Cheese
Cake
Confectionery
Dried Milk
Evaporated Milk
Frozen Cream
Ice Cream
Market Milk
Soup

Malt As a Food Ingredient

By GORDON MACLEAN
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IN ADDITION to its flavor-imparting property, malt has much virtue through its carbohydrate, protein, mineral salts, acid, vitamin and enzyme content. It is easily compounded with other ingredients of a food product, or it can be applied on the surface to give processed products that delectable "tang" which has made flaked breakfast foods so popular.

Of the forms in which malt is available the most commonly known and widely used is malt extract. This is a sweet syrup averaging 80 per cent solids, of which about 6 per cent are proteins, 72 per cent are carbohydrates, and 2 per cent are mineral salts and acids. The proteins range all the way from the simple amino acids to the complex insoluble forms with the easily digestible peptones and amino acids much in evidence. The carbohydrates start with the higher dextrins, on the borderline of the starches, and comprise the entire series through malto-dextrin, maltose and finally dextrose, which is always present in small quantities. The minerals are those natural to the grain, the husk and the water used in its preparation.

Vitamins are present as B and G, and enzymes are represented by the liquifying enzymes which convert starch to dextrin and maltose diastase which converts dextrin to maltose, proteolytic enzymes which break down the complex protein molecules into the simple and more easily digestable forms, and others of minor importance.

Such an unusual variety of food constituents commends malt extract to many uses, although only one of the constituents may be of va'ue in the use to which the extract is put.

In spite of its high sugar content, sweetness in malt extract is not excessive because of the lower sweetening power of maltose as compared to sucrose. Sweetness is further lessened by the presence of dextrins; none of which is sweet.

The taste of malt extract is far from insipid. Aroma may be considered as lacking, but in common with most appetizing foods, the amino-acid content enhances the richness of the flavor. This flavor factor would not be outstanding, however, if it were not for the mineral salts. These salts supplement the amino-acid flavors to give malt extract its characteristic "tang."

The quantity of malt used as a flavoring material in breakfast flakes cannot carry much of this salt mixture with it, but it does impart the flavor-giving "tang." Quite possibly, an increase in the mixed-salts content might emphasize this effect further with pleasing results.

For some purposes, the use of malt for flavor is secondary. For such uses, malt syrup may fit in to better advantage. Malt syrup differs from malt extract in that the enzymes of the malt have converted other starchy materials along with the barley itself. Corn is usually the supplementary grain and may be used in equal quantity with the barley malt. This mixture usually modifies the analysis of the finished product by lowering the protein content, the acidity and the ash. The resulting taste is considerably milder. Also, the enzyme and vitamin contents are lowered, and there is less tendency for the flavor to change with heat or time. The flavor is much the same in character as that of malt extract; the enzyme-converted corn has very little flavor of its own.

THE third member of the syrup series is maltose syrup, in which the flavor is very mild because of the presence of as little barley malt as possible to get complete conversion of the starch to maltose and dextrin. As little as 5 per cent or as much as 25 per cent of malt may have been used in the preparation; the flavor varies in this proportion. Decolorizing carbons may have been employed to lighten the color. If so, the flavor is still milder. Where carbons have not been used, the flavor is delicate and very agreeable, one of the most pleasant flavors available, in fact. The sweetness is the same as for malt extract and syrup. The unfermentable portion, as with the two preceding types, and representing malto-dextrin and dextrin, remains at about 16 per cent of the carbohydrates. By a trick of manufacture, the dextrin content of maltose syrup may be raised to as high as 60 per cent, in which case the product may be an adhesive, a body builder for beer or a baby food.

All of the syrups mentioned are available commercially, and the choice of which to use depends on which characteristics are desired. Any of them may have some residual power to convert starch to sugar, but normally, this power would be very weak in the more highly refined syrups with low malt content. Actually, only malt syrup and extract are purchased when diastatic power is desired. Even with these two, the manufacturing procedure must be designed to preserve this power if it is needed in the product. A teaspoonful of malt extract of high diastatic power will liquify a dish of hot oatmeal in the course of fifteen seconds, if it is stirred in at a temperature of between 75 and 80 deg. C.

For many uses, this liquifying power, or the corresponding diastatic power, is the only property asked of the malt extract. The presence of the sugars and proteins is without advantage. In such cases, the very highest power extracts are indicated. Lower-power types would only add bulk and freight. These highly diastatic types also have a very fine flavor because of the low-temperature evaporation. But age promotes a continual change until, at the end of a year, the product has changed from a light brown to a dark molasses color and tastes much more like molasses than it does like fresh malt extract.

This change of flavor with time may be a disadvantage if the most delicate flavors are wanted, and it may force the keeping of low stocks. It has its uses, however, because the flavors developed by time, or more rapidly by holding the extract or syrup at an elevated temperature for

a few hours, are quite different from the original flavor and often offer desirable modifications for use with such products as cocoa-malt mixes or some types of cookies.

The flavor developed by this "aging" is always much stronger than the original, and consequently, less of the malt may be required to reach a desired flavor level in the product. When spray, drum or tray drying is to be resorted to for the manufacture of the powdered form, ageing will give the added strength of flavor which will allow its use in lower-priced products because of the small quantity necessary to get the desired effect.

Much of the extract and syrup series of malt products is sold in the powdered form. Powdering permits immediate blending with any dry material, and makes for much easier handling than the syrup form. In powder form, a tremendous range of flavors may be obtained and standardized, because, once dried, the flavor of malt will not change. To get a range of flavors, not only may the syrup form be subjected to heat treatment before dilution for drying, but the drying temperature and the dilution may be regulated to give an entirely different type of flavor. Within this range may be found flavors which will blend to perfection with almost any food product.

The most delicate flavors are obtained by the direct drying of the converted barley wort without previous evaporation. The most positive are obtained by drying the concentrated extract or syrup. One per cent of the latter may give a flavor in a sugar-cocoa-milk mix as strong, if not as delicate, as 10 per cent of the former.

All of these powdered products are highly hygroscopic, and for this reason, if not for economy, it may be necessary to hold down the percentage of malt powder in the mixture. This moisture-absorbing tendency offers a justification for using the more highly flavored grades, even though the flavor has not the delicacy of the lower-temperature grades.

IN developing a means for taking advantage of malt for flavoring, the final product itself will largely dictate the necessary form to be used, whether syrup, powder or even unconverted barley malt flour, which is also available. Where subsequent baking or drying is to be done, the syrup form offers the advantage of lower

(Turn to page 433)

FORMS AND USES OF MALT IN INDUSTRY

A—Extra high diastatic power (240)
B—High diastatic power (120)
C—Medium diastatic power (80)
D—Low diastatic power (40 or less)
E—No diastatic power
F—Plain (not hopped)
G—Hop-flavored
√—Used.

FOOD USES	Barley Malt: Distillers'	Barley Malt: Brewers'	Barley Malt: Caramel	Barley Malt: Husked	Barley Malt: Flour	Malt Syrup: Low-Temperature Extract	Malt Syrup: High-Temperature Extract	Malt Syrup: Caramel Malt Extract	Malt Syrup: Purified Diastase	Malt Syrup: Malted Milk	Malt Syrup: Low-Temperature	Malt Syrup: High-Temperature	Malt Syrup: High-Dextrin	Maltose Syrup: High-Dextrin Brown	Maltose Syrup: Low-Dextrin Brown	Maltose Syrup: High-Dextrin White	Maltose Syrup: Low-Dextrin White	Powdered Malt Products: Low-Temperature	Powdered Malt Products: High-Temperature	Powdered Malt Products: Low-Flavor	Powdered Malt Products: High-Flavor
Baby Foods																E					
Baked Goods					√													√			
Bread						B															
						C					C					√		B			
Crackers, Biscuits						E	E				E	E					√		E		
Rolls, Buns						C					D					√		B			
Beverages																					
Brewery Products	√	√	√				√					E	√				√				
Caramel (Brewers')			√																		
Cocoa-Malt-Milk						E			√		E							E	E	E	
Distilled Liquors	√																				
						E					E										
Home Brewing						F	√				F	E									
						G					G										
Malted Milk				B	A				√												
Cereals																					
Cooked Flakes						E					E										
Raw				√																	
Confectionery																					
Barley Sugar														√		√					
Creams																		√	√		
Malted Milk Bars, etc.									√									√	√	√	
Taffy, etc.						E					E			√		√		√	√	√	
Vinegar — Malt		√				E					E										
MISCELLANEOUS USES																					
Adhesive Manufacture	A			B	A					C											
Acetone Manufacture	A																				
Butyl Alcohol	A																				
Grain Alcohol	A																				
Foundry Sand						E					E			√	√	√	√				
Pharmaceuticals																					
Cough Drops						E					E							B			
Digestive Preparations						B		B		C											
Emulsions						E					E										
Extracts											E										
Textile Desizing					√	A												A			
Textile Softening											√				√		√				

In Defense of the Lowly Mold

By MORRIS A. POZEN

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ONE of the by-products of the depression is a type of racket in the form of court action against food manufacturers, chiefly bakers. The plaintiffs sue for damages because of illness allegedly due to eating moldy food produced by the defendants.

Mold spores are so widely distributed in the air, in soil, on fruits, grains and meats that, as one mycologist expresses it,[22] "in dealing with food products they must always be assumed to be present." They are part of the daily food intake. An actual examination[1] of the contents of the intestinal tracts of average normal persons showed that in 47 per cent of 98 persons examined, fungi were present. A very conservative scientist[2] discusses the toxicity of moldy food and concludes: "It is well to remember, therefore, that molds are not unhealthful."

BUT what about the pathogenic molds? Without going into the biological activities of molds, may we point out that the classification of some molds as pathogenic is not based on symptoms caused by ingesting the moldy material by mouth. Certain molds are termined pathogenic because they are involved in some relatively localized infections of the skin (dermatomycoses), of the mouth and throat (thrush), and of the lungs and air passages (pneumomycoses). But even here, one authority, referring to some of these infections,[21] has said, "The presence of molds may be regarded as evidence of lack of care, cleanliness, of even ordinary precautions, when the infections involves man."

An analysis of the complaints in a considerable number of moldy food damage suits indicates that the principal symptoms alleged are: Nausea, vomiting, cramps, diarrhoea, acute gastritis and prostration. The writer has attempted to ascertain whether moldy food, chiefly baked goods, can produce such symptoms. He has repeatedly fed moldy food to laboratory animals in quantities equivalent to one pound per day per 150-lb. man. In no case did evidence of discomfort result in the animals ingesting the moldy food. In some instances the animals were killed by anesthesia at the end of the test period, and postmortem examinations of the organs, gross and microscopic, were made by competent pathologists. But there was no evidence of irritant or other pathological action. The author has frequently deliberately eaten food which was completely covered with mold with no harmful effects. German laboratory technicians are alleged[11] to have consumed considerable quantities of moldy bread in complete safety, while the German investigator, Welte, has stated that moldy bread is not toxic to animals. The writer has discussed the matter with two outstanding mycologists, who had investigated cases of alleged poisoning of stock (cattle and horses) by moldy grain and moldy silage. These mycologists found that grain and silage inoculated with pure cultures of the isolated molds produced no harmful effects whatsoever when fed to animals.

> ▶ ***This article contains information especially valuable to:***
>
> **Bakers**
> **Canners**
> **Meat Packers**
> **Preservers**
> **Confectioners**
> **Cheese Manufacturers**
> **Flavoring Syrup Manufacturers**

PATHOLOGISTS tell us that organisms, in order to produce toxic effects when consumed with food, must contain intracellular toxins (endotoxins), must extrude toxins outside the cell (exotoxins) or must produce poisonous decomposition products. The writer's reading of the scientific literature leads him to conclude that molds as they exist in foods do not produce significant amounts of toxic products by decomposition of the food. He finds also that "no exotoxins have definitely been established."[9] The matter of endotoxins has been studied with unsatisfactory results. For example, Gortner and Blakeslee[8] found that the common mold, *Rhizopus Nigricans,* contains a toxin quite poisonous to rabbits when it is *injected* intravenously or subcutaneously, but the material is entirely harmless by mouth.

Henrici[9] failed to corroborate the above findings of toxicity and concluded that the rabbits used by Gortner and Blakeslee had become hypersensitive to the mold proteins. The investigation of the toxins of another common mold. *Aspergillus fumigatus,* gave equally contradictory results. Henrici[9] concludes: "One may find other scattered references in the literature to possible toxins extracted from pathogenic fungi, none of which are very convincing." In fact, Henrici advises "a degree of healthy skepticism with regard to the pathogenic fungi."

The symptoms alleged by plaintiffs in the moldy food suits are those of food poisoning. There are a number of authoritative works exclusively devoted to this subject. It is interesting to note that aside from references to ergot, a fungus growth which causes spoilage, discoloration and souring of rye, and which produces toxic symptoms of ergotism when ingested by mouth, the well-known works on food poisoning by Damon,[3] Dieudonne,[4] Jordan[10] and Savage[13] do not even mention molds.

The most recent authoritative work on this subject, *"Food-Borne Infections and Intoxications,"*[20] by Professor F. W. Tanner, head of the Department of Bacteriology, University of Illinois, contains more than 400 pages and only one paragraph on molds. We quote that paragraph: "Down through the literature are reports incriminating molds with food poisoning. In most cases, the evi-

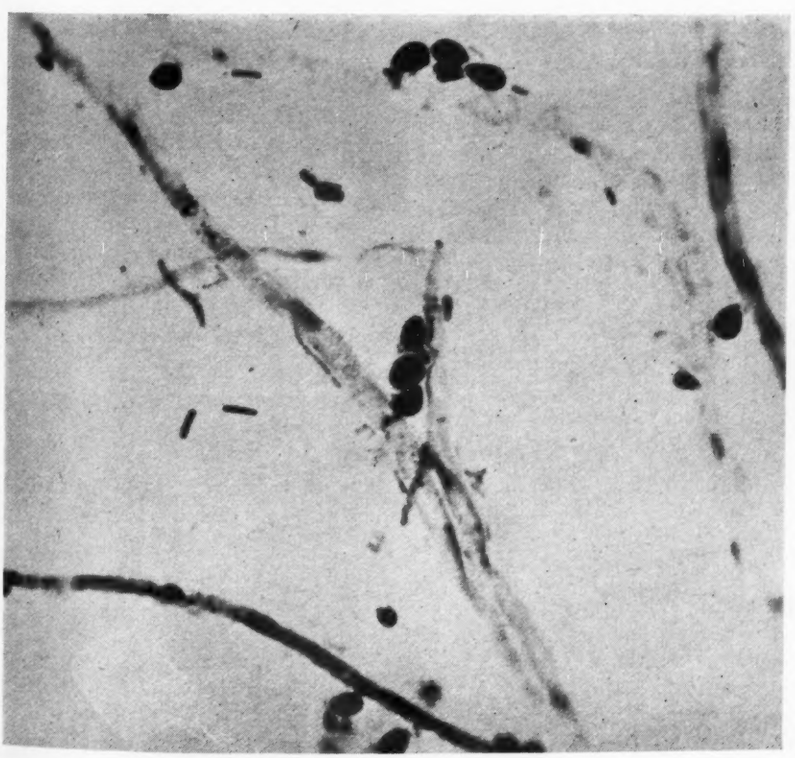
dence is very unsatisfactory. Zickgraf[23] reported a case of poisoning with high fever and severe gastroenteritis attributed to an uncooked dried fig, spoiled by *Aspergillus niger*. Smith[16] reported an alleged case of food poisoning from eating tartlets, said to have mildew on parts of them. Apart from the fact of illness the same evening, with gastric pain, diarrhoea and sickness, no evidence of food poisoning was disclosed, although a claim for compensation was made. The patient suffered from kidney disease and glycosuria. The report discusses the possibility of poisoning from molds and points out that molds are constantly eaten in traces on bacon, jams and other foods, and particularly with cheese. . . ."

PERHAPS a few words should be written in behalf of molds as useful supplements to the diet. Some of the common molds, including members of the genera *Aspergillus* and *Penicillium,* can synthesize their tissue proteins from mineral salts as the sole source of nitrogen. This well known property has led scientists to speculate on the possibility of making some use of mold proteins for food purposes. This subject has been investigated by animal feeding tests in Germany by Pringsheim and Lichtenstein,[12] using *Aspergillus* species; in Japan, by Takata[18] with *Aspergillus Oryzae;* and in this country, by Skinner[14] with *Penicillium* species, by Skinner, Peterson and Steenbock[15] on four different molds, and by Gorcica, Peterson and Steenbock[6] with *Aspergillus sydowi.*

The results of these investigations may be summarized by saying that the mold proteins, were found to be nutritionally deficient in some of the essential amino acids, so that when used as the sole source of protein they would not promote growth of the animals. It was found, however, that when certain other proteins were present in the diet in adequate amounts as supplements, considerable amounts of mold proteins could be included in the ration and good growth resulted.

Yeast is known to every layman as a source of vitamins, especially B and G. Because of the close relationship between yeasts and molds, the former probably evolving from the latter by losing the power to form mycelium or filaments, scientists have speculated on the probable vitamin contents of molds and have investigated the matter. One Japanese investigator, Takata,[19] studying the dried filaments of *Aspergillus Oryzae,* concluded that it contained about one-fifth as much vitamin B as dried brewers' yeast. Another Japanese investigator. Takahashi,[17] used an extract of the same mold to secure good growth of rats and pigeons and to protect them from polyneuritis. Two other scientists, Fawns and Jung,[5] report a striking finding. When they fed a basal-vitamin-B-free diet to rats, the animals lost weight, but when a black mold developed spontaneously on the basal-vitamin-B-free ration the rats were cured of beriberi.

Skinner, Peterson and Steenbock[15] found that the dried mycelium of two molds, *Aspergillus fischeri* and *Aspergillus sydowi,* when fed at a twenty-per cent level, contained enough vitamin B to afford good growth of young rats and to give complete protection against polyneuritis. Gorcica, Peterson and Steenbock,[7] in a more detailed study of *Aspergillus sydowi,* found that it: Contains enough vitamin B to protect chicks against polyneuritis when fed at a 10 per cent level; prevents pellagra in chicks on a ration low in vitamin G when added in the proportion of 1 per cent, and that 3 per cent gives good growth; completely prevents the onset of paralysis when 30 per cent is added to a ration deficient in vitamin B_4.



Photomicrograph (x 1,200) showing mold filaments, yeast cells (egg shapes) and rod-shaped bacteria. Note relative sizes.

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New PACKAGES and PRODUCTS

Mustard in Cups

FOOD MANUFACTURERS in all parts of the country have made successful use of glass tumblers to increase sales of a wide variety of products. And now one company has hit upon the idea that the housewife would like some extra cups in the form of reuse food containers. This is Heintz & Weber, Buffalo, N. Y., which is distributing mustard in cups closed with a metal cap after the manner of the tumblers.

Grapefruit Wine

THERE recently appeared on the market in Texas vinegar made from grapefruit (FOOD INDUSTRIES, July, 1936). Now from this same region comes an announcement that wine produced from grapefruit juice will make its appearance this fall. Valley Distilleries, now erecting a plant at McAllen, Texas, will be the manufacturer.

Prepared Pie Crust

ROMAN MEAL Co., Tacoma, Wash., has developed a pie-crust mixture called "Speed-I-Mix." Made from a formula intended to have good keeping qualities under climatic changes, the product is packaged in a paperboard carton with a tight-wrapped cover. The theme of the company's introductory offer in California was built around EPIC—End Pie Failures in California.

Disney Sells Foods

Two phenomenal sales jumps are said to have been brought about recently by the use of glass tumblers bearing cartoons of Walt Disney characters. Adhor Milk Farms, Los Angeles, saw sales of cottage cheese increase more than 500 per cent in the first week after the new package was put on the market. And Durkee Famous Foods, Berkeley, Calif., reports a similar success with mayonnaise.

Double Attraction

SMART DISPLAY of the product, together with practical reusability, gives Swift & Co.'s container for sandwich spread, mayonnaise and salad dressing two-way appeal. The package is of well-proportioned, rectangular shape, softened by decorative rounded corners. On one side, it bears the product label, on the other a label with the words "Tea Jar," "Coffee Jar" or other designation converting it into a handy pantry container when empty. A decorative yellow metal screw cap tops off the container.

Health Beverage

VITAMINS A, B, C, D and G are combined with calcium and phosphorus in a food-drink base put on the market by Calcivita Co., Inc., Kalamazoo, Mich. This product is made from dehydrated orange and lemon juices, powdered whole milk, powdered egg yolk, calcium gluconate, calcium phosphate, sucrose, dextrose and vitamins A and D from concentrate cod-liver oil. It is said to provide the citric acid and vitamin D necessary for proper absorption of calcium. Its taste resembles that of orange juice.

Ice Cream Powder

A NEW FLAVOR for ice cream is announced by Yeasts & Food Products, Reg'd, Montreal, Canada. Called "Maple Leaf Powder," it contains powdered milk, cream, malt, egg yolk, sugar and some flavor such as vanilla, chocolate, raspberry, and lemon.

Fruit Flavor

FOLLOWING seven years of research, Filice & Perrelli Canning Co., Richmond, Calif., has perfected a fruit ingredient for ice cream. Named "Fruzert," it is made from California and tropical fruits and contains no artificial color or flavoring. Semi-liquid in consistency and creamy in texture, it is ready for use as it comes from the can. The product will whip or fluff, and frozen products made with it can be increased in volume by 100 per cent, the manufacturer says.

Boosts Sales 25 Per Cent

BY REDESIGNING the package for its combination of seven condiments, Crescent Manufacturing Co., Seattle, Wash., effected a 25 per cent sales gain. Windows were placed in one side of the long cardboard carton to show each of the seven glass shaker bottles, and a round opening in the top reveals the perforated cap of one of the shakers. A cellulose wrapper encloses the entire package.

Bottle Hood With Window

WHEN HOODS are used on milk bottles, they ordinarily must be printed with different labels for different grades of the product. But this is not necessary with the hood recently introduced in this country by Bois-le-duc Bottle Cap Manufacturing Co., Ltd., Holland, and distributed by Paul J. Pauls, Plainfield, N. J. Made of tinfoil, this closure has a built-in transparent cellulose window which displays the label on the cap of the bottle, permitting different caps to be used with the same hood.

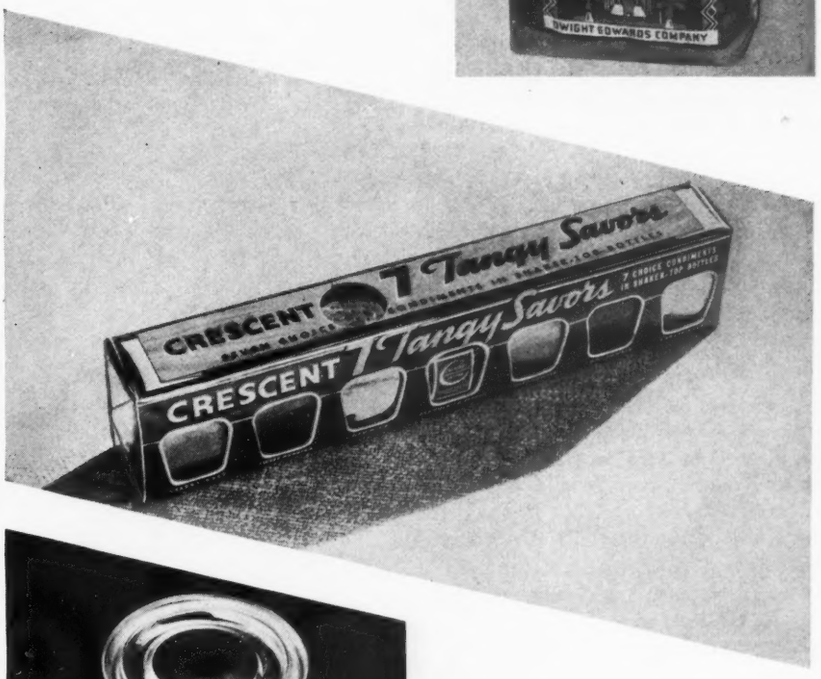
Sales Up 1,000 Per Cent

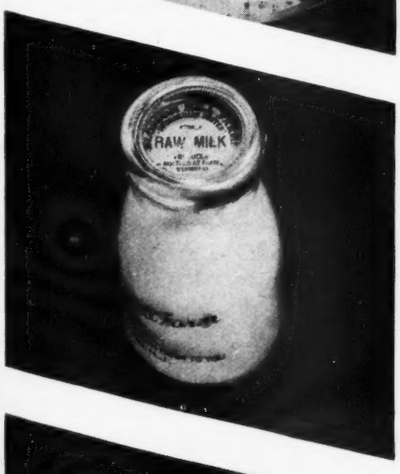
WHEN a new container multiplies the volume of sales by ten in two months, it must be good. That is the phenomenal accomplishment accredited a new bottle adopted for root beer by Charles E. Hires Co., Philadelphia, Pa. Used in 12 and 26-oz. sizes, the redesigned bottle has a modernistic shape, with body and neck labels of light copper-colored metal foil. The bottle itself has a lightly strippled surface and is closed with a crown

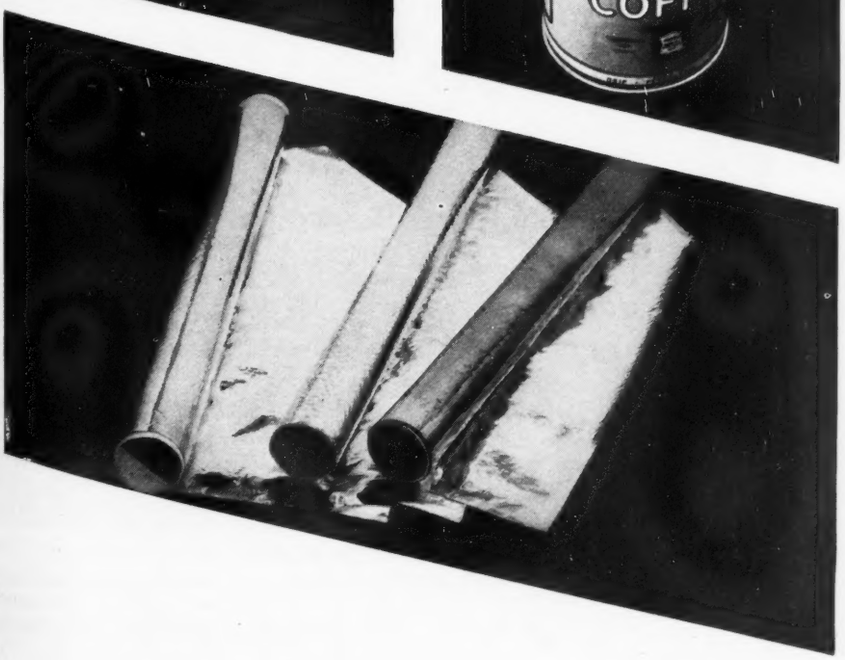
cap. The embossed neck label fits neatly over the bead of the cap.

Baby Tea Bag

FROM the Pacific Coast comes a diminutive tea container. Designed to conserve the limited shelf space in the kitchens of urban homes, the new $1\frac{1}{8}$-oz. tea package of Dwight Edwards Co. has increased business. It is a transparent-cellulose bag printed in yellow and white to catch the eye and make "impulse" sales. The small package retails at 6 cents.







Pressure-Pack Coffee

TO KEEP its coffee fresh, John Hansen & Sons, Oakland, Calif., exhausts the air from the can and replaces it with carbon dioxide under pressure. Then, to assure the consumer that she is getting a package which has not lost its pressure, the company uses a can with a dome top. If the dome can't be depressed, the pressure is up to par.

Silver-Plated Paper

SOMETHING NEW and unusual in the way of wrapping material for food products has been developed by Hy-Sil Manufacturing Co., Revere, Mass. It is cellulose coated with silver on one side and brilliantly colored on the other. This material, rolls of which are illustrated, combines the heat-reflecting qualities of silver with the eye appeal of striking colors. It is, of course, moistureproof.

PROMOTING THE PRODUCT

▶ WILSON & Co., Chicago, has launched an extensive advertising campaign using newspapers in 80 cities. Spot radio announcements supplement the printed advertisements.

▶ GENERAL BAKING Co., New York, is reminding food store men and consumers that the company is 25 years old by a series of promotional activities. It is issuing a four-page leaflet for food stores, putting signs on vehicles, wrapping bread with a special outsert, putting up 24-sheet posters and featuring its silver jubilee in a radio program over 27 stations. It also is publishing a special edition of its house organ and giving every member of its organization a silver-jubilee pin.

▶ BRAZIL NUT ADVERTISING FUND has published a 44-page book of commercial confection formulas which it is distributing free. This compilation indicates more than 50 new tested ways to utilize Brazil nuts in penny pieces, 5-cent bars and bulk goods.

▶ KROGER GROCERY & BAKING Co., Cincinnati, announces a new plan under which its sausage must meet a critical triple test for quality, purity and freshness.

▶ PHILADELPHIA DAIRY PRODUCTS Co., INC., will go on the air over WOR Sept. 7, with a Monday, Wednesday and Friday afternoon program, "Martha Deane."

▶ S. GUMPERT Co., INC., inaugurates in September a Tuesday and Thursday evening radio program, "Inspector White of Scotland Yard," over WOR.

▶ CONTINENTAL CAN Co., New York, has planned one of the biggest newspaper advertising campaigns ever conducted in the interest of beer. Continuing from July 23 through August, the campaign will run in more than 200 newspapers and 193 cities. The ads will show the advantages of the "cap-sealed" can.

▶ OWENS-ILLINOIS GLASS Co., Toledo, recently launched a national publicity campaign in behalf of all packers of tomato products. The program includes publicity articles on tomato juice, tomato juice cocktails, ketchup and chili sauce. Special articles and illustrations of tomato recipes are being sent to home economists. Free multilith copies of all photographs and recipes are offered to tomato packers.

▶ GENERAL FOODS CORP., New York, starts Sept. 28 with a new radio program over the NBC blue network. Featuring Helen Hayes and supporting Sanka Coffee, the broadcast is on Monday evenings.

▶ OYSTER INSTITUTE OF NORTH AMERICA, Washington, D. C., has adopted the slogan, "the real pearl in an oyster is health," for its national advertising campaign. The advertisements will be illustrated with Don Herold drawings and will be amusing.

▶ G. WASHINGTON COFFEE REFINING Co. went on the air July 11 with a new program, "Professor Quiz and His Brainbusters," a Saturday-night broadcast over WABC.

▶ CALIFORNIA CANNING PEACH GROWER'S ASSOCIATION has approved a tentative program for an advertising campaign. Growers and canners will contribute 50 cents per ton of peaches to finance the promotional work.

▶ HOFFMAN BEVERAGE Co., Newark, N. J., inaugurated a radio program, "Transradio News," over WOR, July 14. It is a Tuesday, Thursday and Saturday night program.

▶ CRANBERRY CANNERS, INC., South Hanson, Mass., promoted summer sales of Ocean Spray Cranberry sauce with a four-color advertisement on the back cover of *Christian Science Monitor*.

▶ HOFFMAN-HAYMAN COFFEE Co., San Antonio, has inaugurated a campaign to keep Texas beautiful, the idea being to distribute a package of flower seeds free with each package of coffee.

▶ CHARLES B. KNOX GELATINE Co., INC., is distributing window streamers, lithographed in six colors, which tie the Knox-Jell package up with an appetizing dessert by illustrating both.

▶ DURKEE FAMOUS FOODS is running in *Fortune, Time* and *Nation's Business* a colorful advertising campaign devised to stress the reliability of its products and to make its items more widely known. Reproductions of the advertisements are mailed to distributors with a letter urging them to "talk Durkee and display Durkee."

THEY CAN'T MISS IT

The name of Currie cannot escape the eyes of prospective customers whom this semi-trailer passes on its daily run. And the company's "mile-high" cones also are prominently proclaimed. The tractor-trailer is a 1,000-gal. unit recently put on the road by Currie Ice Cream Co., Long Beach, Calif.

Automatic Control of Temperature in Continuous Processes

FOOD MANUFACTURERS who use continuous processes find in automatic control of temperature a key to successful day-to-day production. The inherent difficulty of maintaining a fixed temperature in a process where all factors are in a continual state of flux makes control by instruments even more remunerative than in batch processes (FOOD INDUSTRIES, May, 1936). And processors see in automatic control of continuous operations the opportunity to realize these five advantages:

1. Elimination of spoiled products.
2. Improvement in the quality of products.
3. Duplication of results from day to day.
4. Increased output of processes.
5. Saving in fuel and power costs.

A UNIT OPERATION OF FOOD ENGINEERING

Controlling

▶ There is even more profit in automatically controlling temperature in continuous processes than there is in regulating batch operations. But special problems are involved and special equipment required in some applications. These problems and equipment are discussed here in simple terms. And some practical applications in the canning, baking, dairy, meat packing, beverage, confectionery, cereal and other industries are described and illustrated.

This is No. 5 of a series on the unit operations of food engineering.

Instruments for controlling temperatures in continuous processes are basically the same as those used with batch operations. But some continuous processes require greater accuracy of control and necessitate refinements not employed for batch control.

Food manufacturers should not assume, however, that all these refinements made for automatic controllers have to be used in continuous-process control. The truth of the matter is that they are used on comparatively few processes, but they are available when needed. The simpler controllers will handle most operations, the only refinement needed, if any, being a throttling-range adjustment.

Need for more refined control arises, of course, from the fluctuating heat demands of the process, ordinarily referred to as the change in load. Consider, for example, continuous pea bleaching. When cold peas are introduced into the intake end of the blancher, the temperature of the solution drops and the control instrument must turn on more steam.

Changes in the rate of flow of the medium being processed or of the heating medium also act to throw the process off balance.

Now, if we introduce along with this load variation a delay on the part of the control equipment in correcting for the change, so that yet a second load condition exists by the time the first is corrected, the difficulty of successful control becomes at once apparent. And instead of the temperature chart following the control point (the temperature which it is desired to maintain) it will wander from that line in most erratic fashion.

THIS second factor, delay, is variously referred to as process lag, application lag and time lag. The former seems to be descriptive, since the lag occurs in the process or processing equipment itself. Consider the process of heating water flowing through a tank over steam coils (Fig. 1). After the valve opens on a drop in temperature, there is a delay while the steam passes from the valve through the coil, another delay while the heat passes through the walls of the coil to the water, and a third delay while the heated water flows to the sensitive bulb. As seen from this example, process lag may be defined as the time which elapses between the instant the controlling valve changes the flow of heat to the process and the instant the effect of the change is felt on the sensitive bulb.

These factors obviously are unfavorable to satisfactory control. But in a great many processes, there enters another factor which usually helps to overcome the effect of these unfavorable ones. Called capacity-demand ratio, it can best be understood by referring again to Fig. 1. Suppose that there is a large volume of water and that it is flowing slowly. This not only means that the water will have a high heat capacity, but that the demand for more or less heat at any moment will be comparatively small, giving a high capacity-demand ratio. With this condition, the control valve can admit a large amount of heat without seriously over-reaching the control point, or it can remain closed for a comparatively long time without the temperature falling far below that point. Obviously, this simplifies the control problem and makes the need for a highly refined control system less imperative, because the amount of heat that must be controlled is small in comparison with the total heat of the process.

Consideration of the effects of process lag make it evident that the design of the processing equipment has an important bearing on the success with which automatic tempera-

ture can be applied. And some attempts at control have turned out badly for no other reason than that the equipment was not suitable, being of a type that introduced a great amount of process lag in one form or another. This is a point that food manufacturers should keep in mind, and it is a reason why complete information on the process to be controlled should be placed before the engineers who are to design the control apparatus.

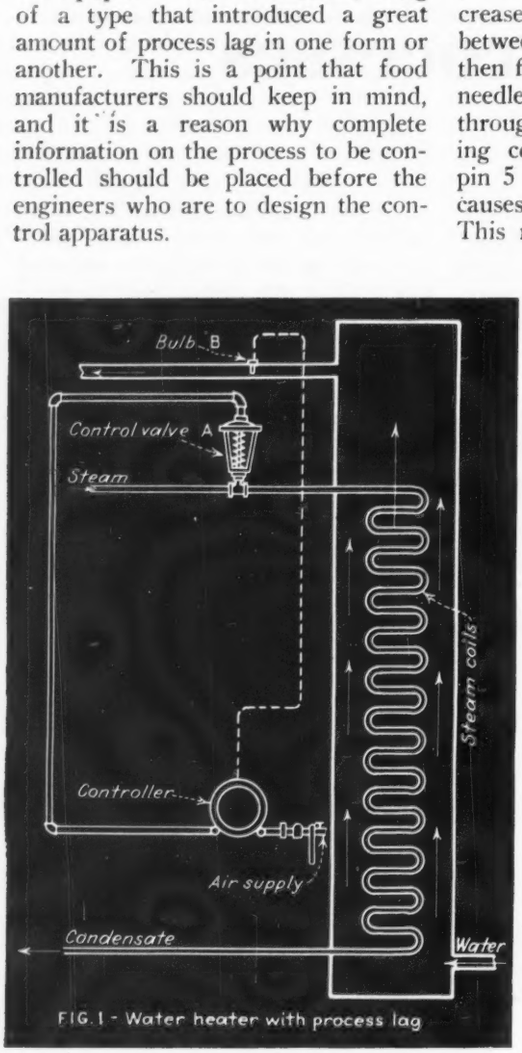


FIG. 1 - Water heater with process lag

Among the refinements adapted to pneumatic controllers to overcome difficulties encountered in continuous processes, one sometimes used is a mechanism for automatically resetting the control point when the load changes. Instruments incorporating this feature also are called stabilized controllers. Varying in design according to the manufacturer of the controller, this automatic reset mechanism proves beneficial in applications subject to large or frequent load changes with or without large process lag. The function of the control-point reset device is to synchronize the return of the process to the control point after a change of load with operating conditions to give the best possible character of control. While not at present used in many food processes, this type of controller may find wider application as time goes on.

Fig. 2 shows diagramatically one type of automatic reset controller. This is how it works: An increase in the controlled valve pressure increases the pressure on liquid A between bellows 1 and 2. The liquid then flows from space A through the needle valve, which is adjustable, and through passage 3 to space B, causing connecting rod 4 carrying the pin 5 to move to the left. Spring 6 causes arm 7 and pin 8 to follow. This moves flapper 9 toward nozzle 10, increasing the controlled-valve pressure. The rate at which flapper 9 is moved and the controlled valve pressure is increased depends upon the rate at which the liquid flows from A to B, or upon the pressure differential between A and B. This in turn, depends upon the distance of the pen below the control index.

As the flapper moves toward the nozzle, the valve pressure increases, admitting more steam and raising the temperature in tank 11. Then, as the pen moves upscale with the temperature rise, the pressure difference between A and B decreases until they are in equilibrium, at which point the pen will coincide with the control index.

A system of this type takes into account the rate of departure from the control point. If the pen were to return upscale unusually fast, pressure spring 12 would move pin 8 so as to lift flapper 9 faster than the reset-liquid displacement moves pin 8 to let the flapper cover the nozzle, with the result that the valve pressure is decreased as the pen approaches the control index.

ANOTHER auxiliary device for pneumatic controllers sometimes can be used to advantage where there is a large process lag and where a wide throttling range is employed to synchronize the control with the lag to avoid "hunting" (rapid fluctuation of the temperature from one side of the control point to the other). With a wide throttling range, a small movement of the pen causes but a slight change in pressure on the controller be sufficient to overcome the effect of valve friction and force the valve to assume the exact position that it should. Under such conditions a hunting, or oscillating, type of control results.

THE mechanism by which this difficulty is overcome is, in effect, an air relay which multiplies the change in pressure on the valve until it has taken the correct position. This relay is actuated by the controller, and it in turn controls a supply of air at a pressure of 25 lb. per sq. in. Thus, what would otherwise be a very small change in pressure on the valve diaphragm is amplified to a point where valve friction is overcome easily. But the relay valve also is connected to the stem of the controlled valve so that the position of the valve is a factor determining the pressure applied to the diaphragm.

It is the general practice among manufacturers of pneumatic controllers to build into the more highly refined models a simple mechanism for adjusting the throttling range, or sensitivity, of the controller. This adjustment changes the relation between the air nozzle and the flapper so as to vary the amount of pen travel required to move the valve from an open to a closed position. This usually is accomplished by moving the fulcrum of the flapper so that the flapper blade moves through a greater or smaller distance for a given pen movement, or temperature variation (see Fig. 2 for one type of throttling range adjustment).

Occasionally, reference is made among instrument users and manufacturers to anticipating types of control. Strictly speaking, there is no such thing, because anticipation is a function of judgment. But an anticipatory effect can be obtained in controllers by using two bulbs, one being located ahead of the other in the process. The first sensitive element, then, is connected to the instrument in such a way that it changes the control point according to the temperature in an early stage, say two-thirds of the way through the process. Such a connection is shown in Fig. 3, where an electrical instrument with metal contacts is used. This sometimes is called a double-unit controller. In this instrument, the one sensitive element moves the pointer while the other, through a linkage, moves the arms with which the pointer makes contact. Pneumatic controllers can be connected in a similar way.

Electrical controllers, too, have refinements not mentioned in the article on batch-process temperature control. These take the form of more or less complicated circuits designed to give the controlled valve more flexible performance and make it throttle more accurately. Here again, few food processes require these refinements. As will be seen later, the comparatively difficult task of controlling the temperature of a continuous milk heater can be handled with nothing more involved than the double-unit electrical controller.

IN the matter of valves for regulating the flow of the heating medium, there exists the erroneous conception that throttling valves go hand in hand with continuous processes. It is true that throttling valves are widely used in these applications, but it is also true that they should not be used if the open-and-shut valve will do the trick. The latter not only are more dependable, but require less complicated and costly controllers.

Open-and-shut valves generally will control satisfactorily those processes where the heat capacity is large in proportion to the demand. Under such a condition, the valve can open wide and remain open for a time without supplying too much heat to the process. Then it can close and remain closed for a while without the process cooling too much.

Open-and-shut control frequently can be advantageously applied where bypass control is permissible. By bypass control is meant the regulation of the flow of only a portion of the heating medium (enough to lower or raise the temperature to keep it on the control point) which is passed through the controlled valve. The remainder of the heating medium is uncontrolled. Such a method can be employed where the load is fairly constant, as in a traveling bake oven, for example. It simplifies the problem of control and the apparatus required.

In many continuous processes, a throttling valve must be used to obtain the desired character of control. And where this is the case, it is important that the entire controller system, and not just the controlled valve, be designed to give the throttling performance desired. The system should be built as a unit.

When actual applications of automatic temperature controllers to continuous food processes are considered, it is seen that the problems are much simpler than one is led to believe from a general discussion of the subject. This is true because the more involved problems do not enter into many applications. As a matter of fact, even self-acting regulators are considered satisfactory in some processes.

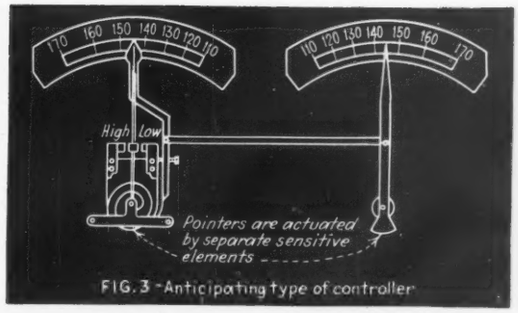


FIG. 3 - Anticipating type of controller

Among these simpler applications controlled by the self-acting regulator are water heaters which have a reasonably constant load so that the throttling valve can settle down to a definite position. Under such conditions this controller will maintain the temperature within a few degrees of the control point.

Water-type exhausters in canning plants sometimes are equipped with self-acting regulators to control the admission of live steam into perforated pipes in the bottom of the tank, the sensitive bulb being in the water at a point near the steam valve. In one grapefruit cannery, for example, such a controller keeps the temperature of the water at about 170 deg. F.

Self-acting regulators frequently are used on bottle washers, too, although simple pneumatic controllers are preferred by some for this work (Fig. 4). These machines have from two to four tanks of solution through which the bottles pass during tempering, soaking and scalding operations, and one controller is installed on each tank. Automatic control of bottle washing temperatures is important. The initial tank must be sufficiently hot, around 110 deg., to heat the incoming bottles in preparation for the soaking operation, yet it must not be so hot as to crack the cold glass. In the second and third tanks, where soaking takes place.

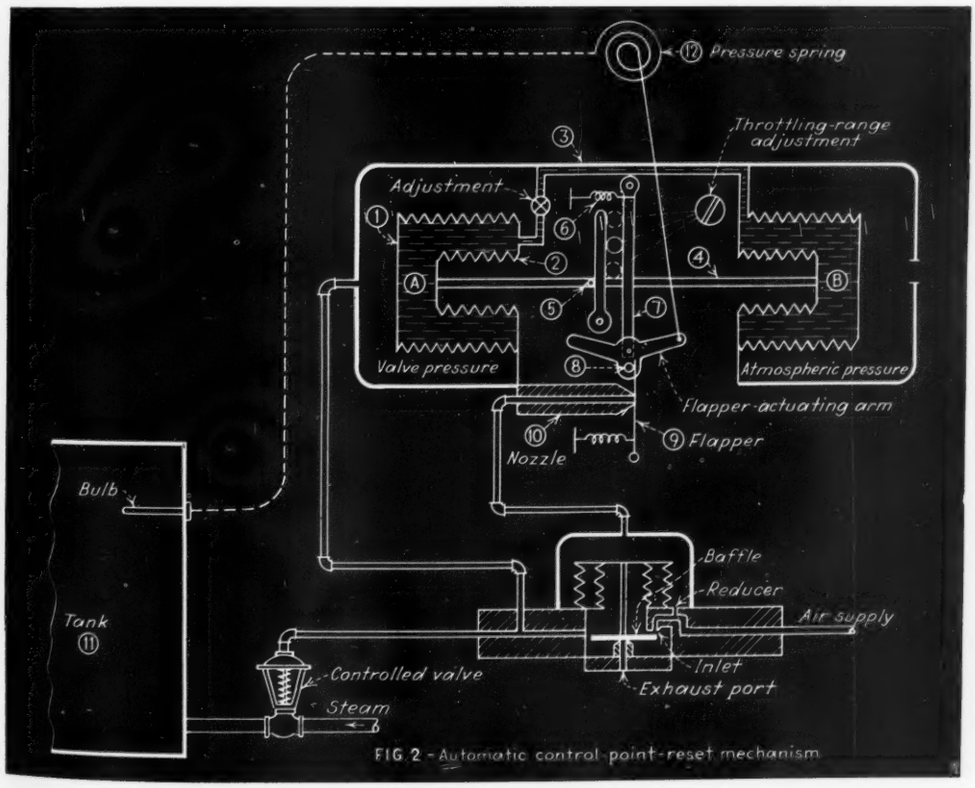


FIG. 2 - Automatic control point-reset mechanism

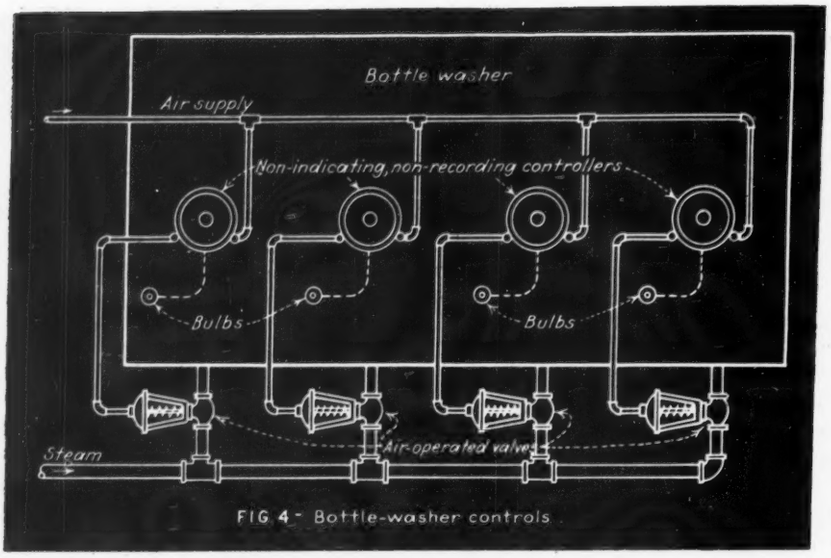


FIG. 4 - Bottle-washer controls

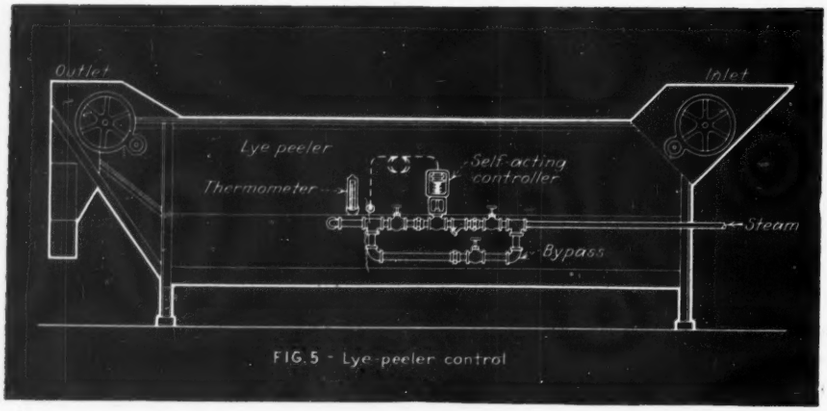


FIG. 5 - Lye-peeler control

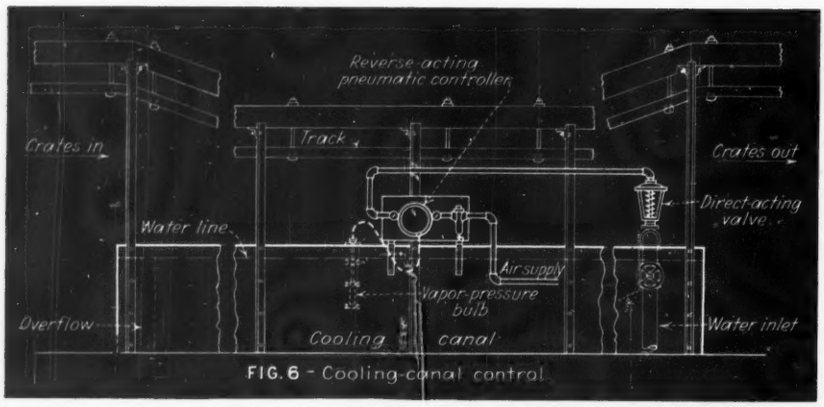


FIG. 6 - Cooling-canal control

the temperature must be maintained at the most active point for the solution, which varies from 190 to 208 deg. Finally, the rinsing tank has to be kept at around 210 deg. to insure efficient removal of the soaking solution.

Temperature-control systems for bottle-beverage pasteurizers closely resemble those for bottle washers, and self-acting regulators are used quite often. Otherwise, recording or indicating air-operated controllers are generally employed.

There ordinarily are two or three tanks to be controlled in a beverage pasteurizer. If the product is filled into bottles while hot and passes directly to the pasteurizer one tank is sufficient, but where it is filled cold, there must be an additional tank to temper the product to avoid bottle breakage from heat shock. Pasteurizers are controlled at temperatures from 180 to 208 deg. F.

In the canning plant, self-acting regulators have been applied to lye peelers (Fig. 5) and to continuous open cookers. In the former it is essential that the temperature be at the correct point. If it be too high, the product will be damaged by the lye, and if too low, the peelings will not be dissolved. Correct temperature also means a minimum consumption of lye.

The self-acting unit satisfactorily controls the continuous open cooker because the process has a high heat capacity which obviates need for a sensitive instrument. The purpose of automatic control in this case is to guarantee uniform quality, insure thorough sterilization in the shortest time, prevent discoloration, mushing, pulping and poor flavor, and to minimize steam consumption.

Unfortunately, all canning plant processes are not as easily controlled as those just mentioned. The continuous pressure cooker, for example, requires a highly responsive controller because the cooking is done in steam and not water. A pneumatic controller with a vapor-pressure sensitive element has proven suitable.

Precise control of this continuous cooker is important, because the canner wants to secure complete sterilization in the shortest possible time. And this must be accomplished without damage to the texture, color or flavor of the product. Reduction of steam consumption too, is a function of automatic control in this case.

SIMILAR temperature control apparatus is installed on the cooler into which the cans pass from the cooker. There the controller regulates the flow of the cooling water in accordance with heat demand of the incoming cans. The cooler is equipped with pressure controls, too, the purpose being to maintain the pressure at a point 50 per cent below that of the cooker. Pneumatic controllers regulate both temperature and pressure.

When the canner has to pay for water used in cooling, temperature of this operation becomes important from the cost standpoint. There is one example of a canner who reduced the amount of water used in a cooling canal by enough to pay for his control equipment in a very short time. The system he used is shown in Fig. 6. It consists of a reverse-acting, vapor-actuated pneumatic controller.

Pea blanching represents a difficult control problem in the canning plant. Coming from the washer at a tem-

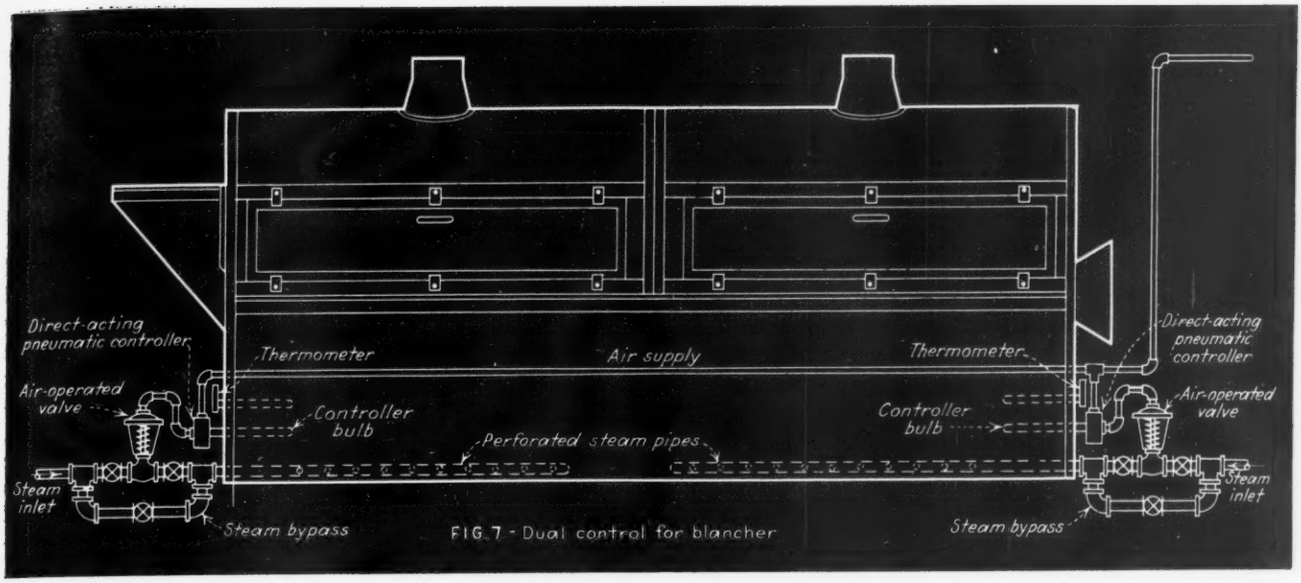


FIG. 7 - Dual control for blancher

perature of 50 to 70 deg., the product pulls the temperature way down in the intake end of the blancher. With one controller, this has the effect of giving too low a temperature at the intake end and too high a one at the discharge end. But proper control becomes easy when two separate steam pipes are used to heat the solution, one at the intake and the other at the discharge end, with one controller used for each section of the blancher. Direct acting pneumatic instruments, with the bulbs in the ends of the blancher are suitable for this application (Fig. 7).

Accurate control of temperature in blanching prevents boiling over at the outlet end while maintaining the proper temperature at the inlet end. It effects thorough cleansing of the product and protects its color, firmness and texture. It avoids breakage of the outer membrane of peas with consequent starch liberation and cloudy liquor. And finally, steam consumption is reduced.

The canner also needs automatic temperature control on vapor-type exhausters, because otherwise the temperature will become excessive when the machine is stopped temporarily for such reasons as making adjustments to the capper. Pneumatic controllers are generally used.

In the meat packing industry, the process of scalding hogs requires reasonably close temperature control for best results. Simple types of pneumatic controllers are often employed, the one shown in Fig 8 being a direct-acting controller with no indicating or recording mechanism. Self-acting regulators, too, are found on hog-scalding vats.

THE sugar industry, too, has made applications of the self-acting regulator. Among these is the control of temperature in a juice heater, as illustrated in Fig. 9. The juice flows from the crusher to an open tank and from the tank is transferred by a motor-driven pump through the heater to an evaporator. Both exhaust and live steam are supplied to the heater, but the regulator valve is in the live-steam line, with the bulb in the juice outlet. The regulator maintains a temperature in the product of about 235 deg. F.

Candy manufacturers find various applications for automatic control of temperature in continuous processes, and one of the most important is in applying coatings. In this process it is essential to maintain the best pouring temperature. If the chocolate is too hot there is an immediate separation of the oils, and if it is too cool an excess quantity adheres to the centers and produces an improper and non-uniform coat. Simple pneumatic controllers will handle this control problem, keeping the temperature close to the 90 or 92-deg. mark generally employed. It will be noticed in Fig. 10 that the sensitive bulb is located in the pipe through which the chocolate is pumped to the

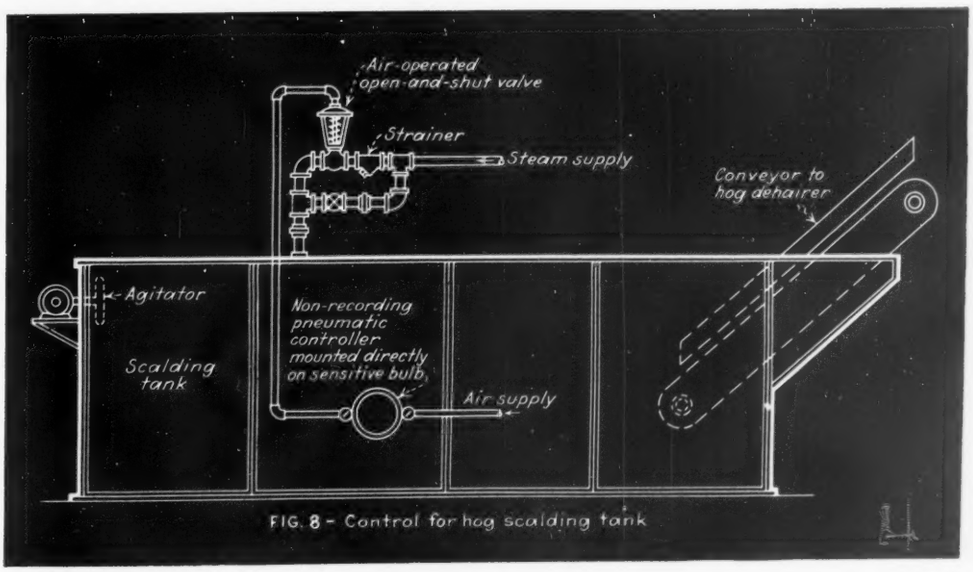


FIG. 8 - Control for hog scalding tank

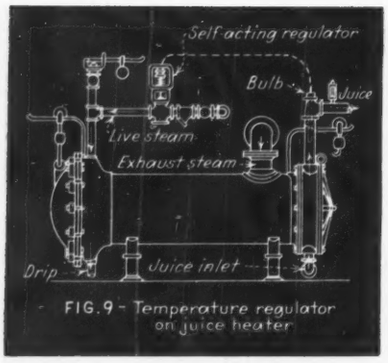


FIG. 9 - Temperature regulator on juice heater

spray reservoir. But the bulb is easily removed to permit the pipe to be steamed out without over-ranging the instrument.

Cereal processors, like the candy manufacturers, find close temperature control highly important in some processes. One of these is toasting. In this operation, when done continuously, the product sometimes passes through as many as three temperature stages, although a single high-temperature may be employed to cause immediate hydration. In any event, accurate temperature regulation is imperative to avoid toughness, burning and sogginess and to obtain the proper color. For this application, recording pneumatic controllers actuated by mercury and equipped with temperature-compensated capillary tubing have proven adequate. These control throttling valves in the gas-supply lines. In this process it is advisable to employ an instrument in which the throttling range may be adjusted to the process lag of the individual toasters to get proper performance without hunting.

One large cereal manufacturer uses pneumatic controllers to maintain the correct temperature in the explosion chambers of cereal puffing machines (Fig. 11), these instruments having a range of 0 to 1,000 deg. F. Their bulbs are in the explosion chamber and the controlled valves in the gas supply line. During the process, the cereal is put under steam pressure in a tube and then discharged into the gas-heated chamber where the sudden release of pressures causes the grains to swell.

Several applications of self-acting and of pneumatic temperature controllers have been cited, but food manufacturers also make extensive use of electrical controllers in continuous-process-temperature regulation. An interesting example is found in the plant of a large breakfast-food manufacturer. In that plant, a certain type of wheat biscuit is toasted in huge, electrically heated, traveling ovens. It requires about one hour for the product to travel from one end of this oven to the other, so there is a large amount of it in the oven at one time. This makes temperature control important from a production-cost standpoint, because too high a temperature would damage a great amount of product. But that does not represent the only reason for automatic control. The manufacturer desires, also, to obtain an appetizing and uniform color of the biscuits and to make them crisp.

THE method of controlling this oven is to automatically "make" and "break" the circuit of a few of the heating elements. This is a form of bypass control, the major portion of the heat load being passed around the controlling switch. Bypass control is particularly important in this application, because with the full oven load of some 200 amperes on the controlling switch, the contacts would quickly be damaged by arcing current.

Fig. 12 illustrates the control system for this oven, representing only the controlled heating elements. The temperature being high, a thermocouple is the sensitive element, with a potentiometer doing the controlling. The potentiometer has "high" and "low" contacts, and it makes and breaks the circuit through a holding type relay which in turn operates the magnetic switch that turns the power on and off. This controller will function on any type of high-temperature, electrically heated equipment, while a resistance thermometer with a Wheatstone-bridge instrument will control similar low-temperature processes.

Equally interesting is the electrical control system sometimes used to regulate the temperature in large traveling bake ovens (Fig. 13). This system involves five thermocouples, one located in each of the four zones of the oven and the fifth in the flue. All five of these units are connected to the controller in such a way that the instrument functions on the average of the temperatures at the five different points. But a selector switch permits an indicator to show the temperature at any of the five thermocouples. This makes it possible for the operator to adjust the burners or dampers in the different zones of the oven so as to obtain the proper relation between the temperatures at these points.

The controller, in this application called a pyrometer, is a millivoltmeter, the pointer of which dictates the operation of a mercury switch. The switch controls a motor-driven valve in the gas line supplying the main burner. Of the open-and-shut type, the valve operates between certain limits and is never fully closed.

In ovens of this type, there sometimes is installed another electrical control device as protection against accumulation of unburned gas and the explosion which would result. One type of oven protector operates on a current which passes through the flame itself.

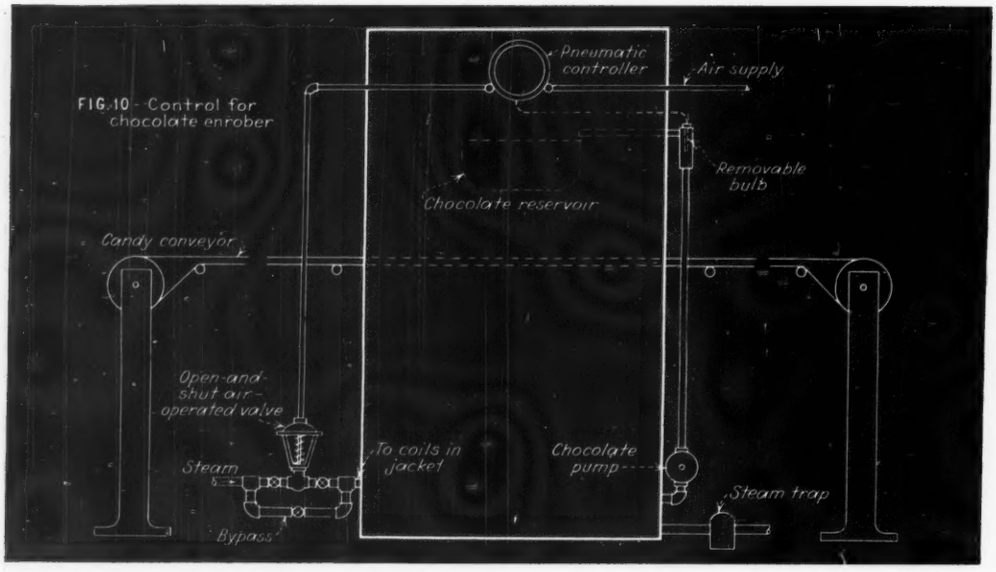


FIG. 10 - Control for chocolate enrober

When the flame is extinguished the circuit is broken and the fuel is automatically turned off. An amplifier of the radio type magnifies the current carried by the flame to give power to operate the system.

CONTINUOUS heating of milk represents one of the toughest problems of automatic temperature control encountered in the food field, not only because health regulations specify close control, but because the process itself is difficult to regulate. Both pneumatic and electrical controllers are employed in this application, the latter being shown in Fig. 14. This system consists of a double-unit controller with one bulb in the milk outlet of the first stage of the internal-tube heater and the other in the line which circulates water through that stage. Supplementing this controller is a single-unit instrument which regulates the temperature of the water in the second stage. If there were only one stage of heating the single-unit controller would not be needed.

One of the more recently installed control systems for two-stage milk heaters consists of a double-duty air controller, one control regulating the temperature of the milk delivered from the finishing stage and the other the temperature of the circulating water in the preheating stage. Some dairies employing pneumatic controllers on pasteurizers favor "stabilized" instruments.

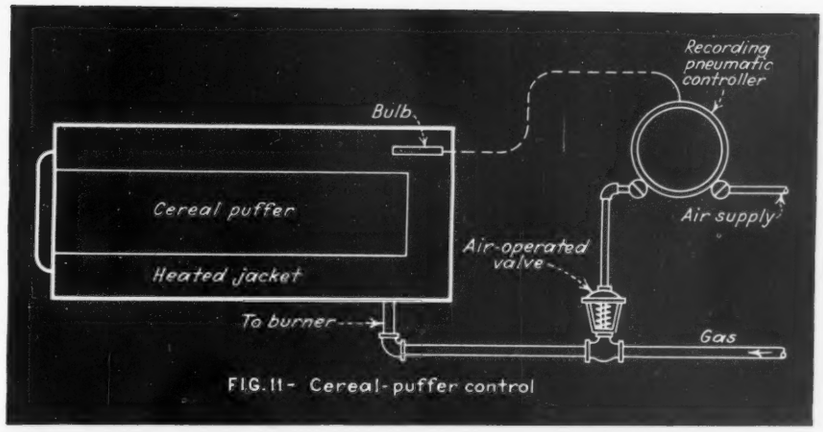


FIG. 11 - Cereal-puffer control

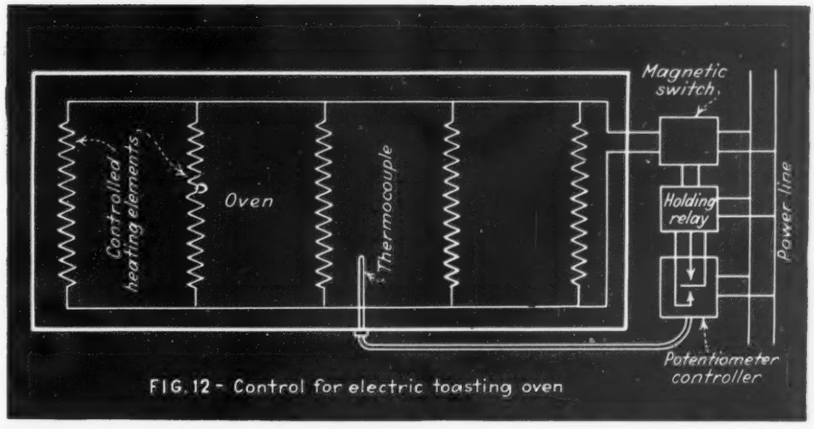


FIG. 12 - Control for electric toasting oven

In drying food products, it is important to have controlled temperature, because it is the only means of obtaining uniform results. And control of this process is difficult too, because the hot air through which the drying is effected has little heat capacity. Extreme accuracy of control, however, is not necessary in some drying operations, especially in those

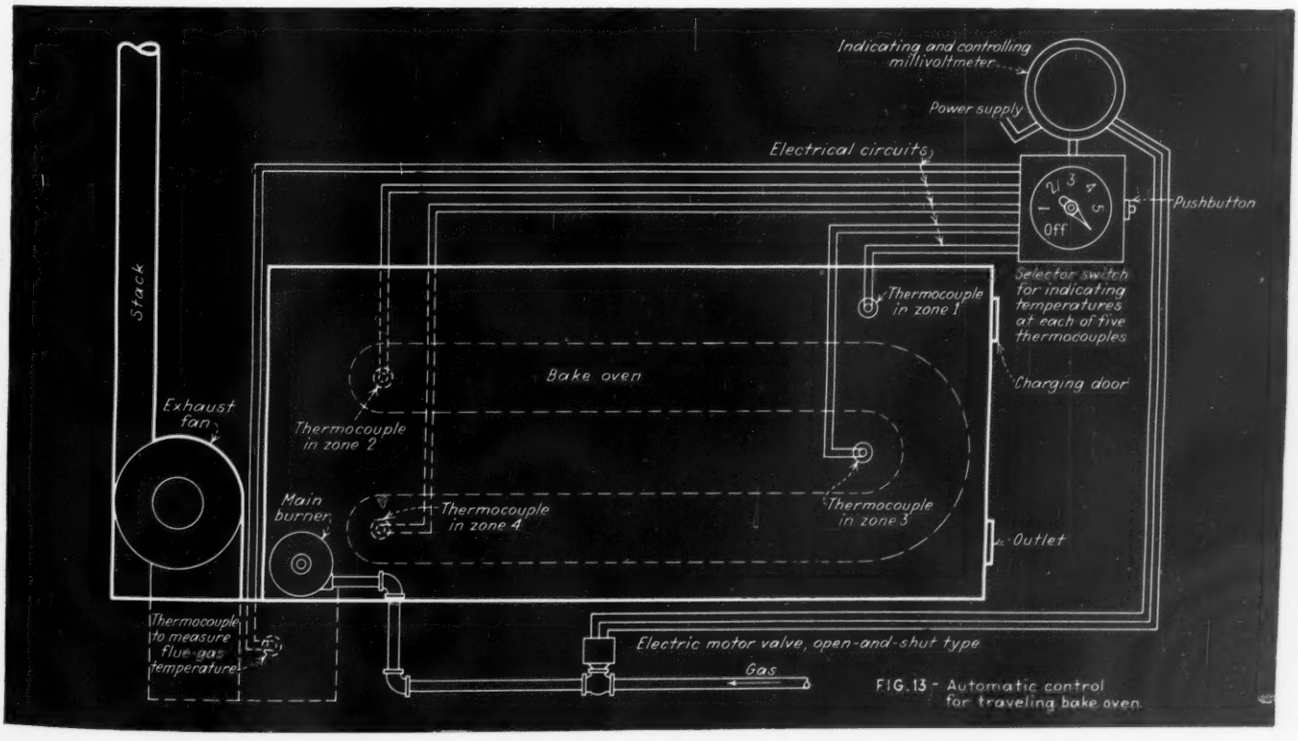


FIG. 13 - Automatic control for traveling bake oven

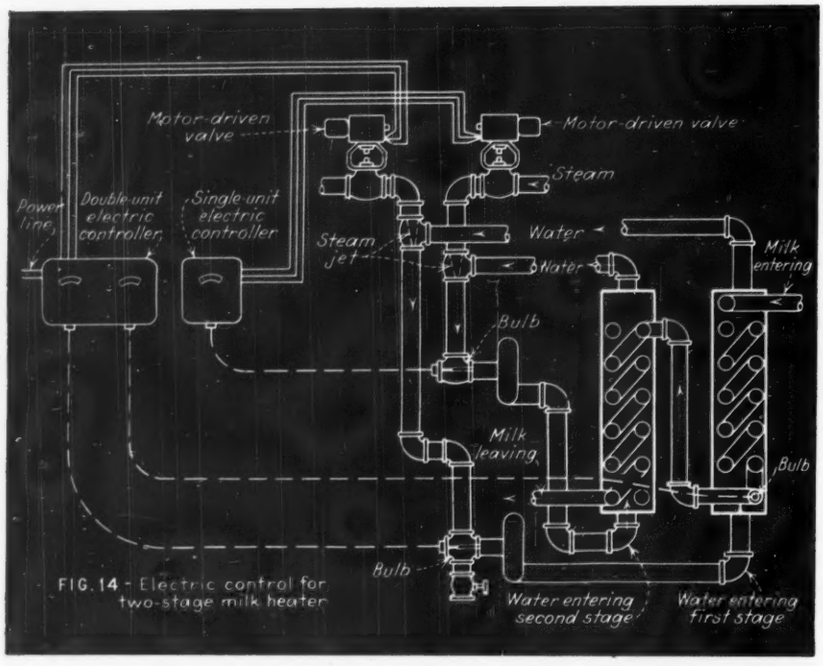


FIG. 14 - Electric control for two-stage milk heater

employing high temperatures, between 180 and 260 deg. F. So it is sometimes permissible to use self-acting regulators. But at the low temperatures, below 180 deg., the requirement for greater accuracy usually dictates the use of power-operated controlled valves. Pneumatic controllers with gas-filled bulbs are popular for this work, and Fig. 15 shows how this type of apparatus is connected to a drier.

More than one controller often is required in drying operations, because some products are exposed to high temperatures at the early stages of drying and lower temperatures in the latter stages. Still others are exposed to low temperatures at the start, higher temperatures in a second stage and low temperatures again at the finish. There also are products which require not only drying but cooling and conditioning, wet- and dry-bulb instruments regulating the conditioning phase.

Accurate temperature control sometimes prevents long and costly production delays. This is true in one type of milk drying plant. In this instance, milk is recirculated from a spray drier though a heater until concentration has been completed. The milk passing through this heater is partially concentrated, and if its temperature goes above 162 deg. F., it will cake on the tubes of the heater. When this happens, the plant must be shut down for about two and one-half hours while the heater is cleaned. In the control system used, an accurate pneumatic controller, with the bulb in the milk line, controls the supply of steam to the heater.

A system for supplying hot water at an accurately controlled temperature is shown in Fig. 16. Two pipes discharge hot and cold water into a common mixing pipe. There is a direct-acting air-operated, throttling valve in each supply line, and these valves are controlled by the same instrument, the bulb of which is in the mixed water line. The valve springs are so adjusted that the cold-water valve is open when the temperature is high, the hot-water valve, only, when the temperature is low and both partly when temperature is normal.

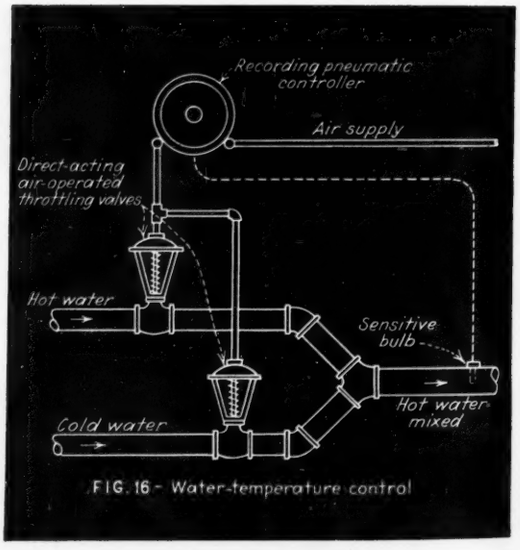


FIG. 16 - Water-temperature control

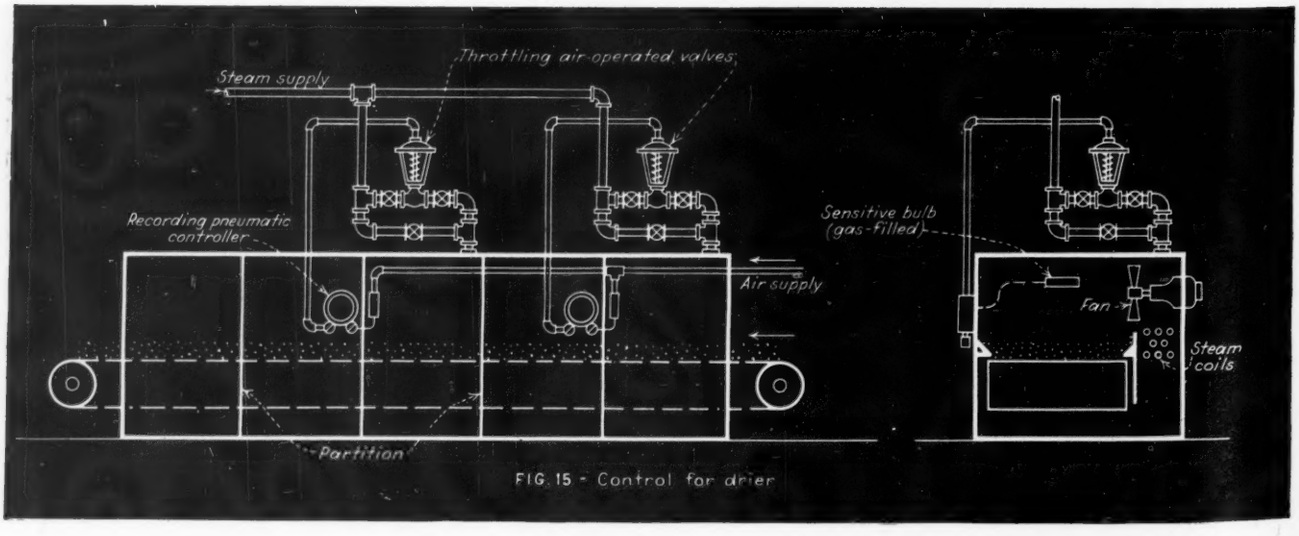


FIG. 15 - Control for drier

EVERYDAY OPERATING PROBLEMS OF FOREMEN · SUPERINTENDENTS · PRODUCTION MANAGERS

Obscure Causes of Off-Quality

WHEN every employee in a food plant understands where off-flavors or off-colors can come from, there is considerably less chance of making mistakes. Off-quality is always costly because the tiniest trace of a bad flavor or discoloration will lose a lot of customers. And some of them will never come back.

The most difficult to run down are those vague off-flavors that nobody seems to be able to describe. Furthermore, there are lots of people whose sense of taste is so dull that they can't recognize an off-flavor. But practically everybody can see an off-color.

Off-Color and Off-Flavor

The possible causes of such off-quality troubles would make a pretty long list. Right now we are thinking of the very minute traces of metals that some wet foods can pick up from the equipment. Of course, many metals and alloys and linings resist dissolving in foods much better than others. But there are enough plants in the counrty that are still using older equipment to make it quite a hazard for years to come.

It doesn't take very much of some metals to start the trouble. A little over 15 parts of copper per 1,000,000 of tomato products will affect the color. About 3 or 4 parts of copper per 1,000,000 of pickles will affect both color and flavor. About 1 or 2 parts of iron and copper per 1,000,000 of milk will produce the "oxidized" or "cooked" flavor.

And now Dr. A. C. Dahlberg of the New York Agricultural Experiment Station has found that even under excellent operating conditions the amount of iron and copper picked up by milk may be 0.1 part per 1,000,000. It isn't much. The amount is even too small to affect the flavor of a large quantity of milk going through the equipment if it is well mixed. But if the first milk to go through is kept separate its flavor will go off, because he has found that, after the first milk goes through, the solution of the metals stops. All the contamination is in the first milk. So he recommends throwing away the first few gallons to come through rather than to run the risk of getting all the metallic contamination in a few bottles where it will be sure to create ill will.

This is a good common sense recommendation. Corn canners have done the same thing for years. You can scrub and sterilize the bronze parts of a corn filling machine for hours, but the first corn to come through will almost always pick up a trace of metal and may turn dark in the course of months.

Watching these fine points of quality control is something in which the whole organization must cooperate. Of course, any good foreman would not dump anything without authorization from his superintendent, but he can be studying the problem and learning.

Science Vs. Common Sense

IT is not always true that common sense will beat out science when it comes to finding the answer to trouble in the factory. Sometimes common sense fails. And it's a smart production man who knows when to use the laboratory.

Listen to this one. A certain concern was getting ready to put out a special line of packaged goods for the Easter trade early last spring. These were to be wrapped in printed transparent cellulose wrappings. Orders were piling up. Yet the plant could not make shipments. Reason? The ink on the wrappers was sticky. It would not dry. Of course the receiving and purchasing departments should have caught it, but they didn't.

The production department tried everything they could think of. Nothing worked. The sales department were yelling their heads off.

Nearly three weeks were wasted. Everybody was trying to find some way of wrapping the sticky sheets around the candy packages so that the printing would not offset or stick the packages together.

Finally the matter was put up to the research department. That move should have been made long before three weeks went by.

Cure for Sticky Labels

In two short hours the research laboratory had the answer by dusting with a suitable powder which absorbed the stickiness. Of course, anybody who knows anything about research knows that that was pretty fast work. Ordinarily it takes somewhat longer to solve a problem.

It would have been good common sense to have referred the sticky printed wrappers to the research laboratory after only two days had gone by, without waiting two weeks.

Common sense is a very valuable article around the factory. But there is more to common sense than trying to do everything without the help of the laboratory. Don't wait very long before asking the laboratory men to help out. That is what they are hired for.

Beware of Ceiling Drip

A DRIPPING ceiling is worse than a nuisance. It is worse because, even though the drip is only moisture condensed out of the air, it is a spoilage hazard. If the drip falls onto foods it may start spoilage.

The reason is that ceilings are seldom sterile. You can sterilize floors and walls quite easily but it is much more difficult to keep molds, yeasts and bacteria off the ceiling.

Even when foods, like beer, ale or wine, are stored in closed wooden tanks there is danger from drip. Contaminated liquids, such as ceiling drip, can sometimes seep through tiny cracks between the staves in the course of time.

Remedies are: 1. Control the humidity to avoid drip. This may require special equipment, special insulation, or it may mean keep water off the floor. 2. Use a special type of metal ceiling that will drain off any condensate; 3. Protect exposed foods or wooden tanks from the drip.

NEW DISCOVERIES AND INVENTIONS

BRIEF REVIEWS OF NEW METHODS, PROCESSES, RESEARCH AND PATENTS IN THE FOOD INDUSTRIES

New Ways to Handle Fruit Juices

OLD CORKS that have been shoved inside of carboys and allowed to mold are a source of contamination and spoilage of grape juice. They cannot be sterilized, so they must be removed. New corks should be paraffined, hot, just before using.

Much contamination of juice takes place during filtering because press cloths and equipment are only washed with warm water, whereas they should be sterilized first.

Commercial pasteurization of grape juice in open kettles is usually done at 190 to 195 deg. F. but could be just as well carried out at 165 deg. F. as far as destroying molds, yeasts and bacteria are concerned. But the lower temperature of pasteurization does not, alone, improve flavor, aroma and color, nor retard formation of precipitates in the juice.

However, if the juice is pasteurized at 165 deg. F. for 30 minutes and then stored under very high vacuum (1 cm. of mercury pressure) or is filled into bottles in such a way that they contain substantially no oxygen, it seems to stop all the undesirable changes of flavor, aroma, color and precipitation. It will even withstand the action of light.

In partially filled bottles the juice deteriorates rapidly. The head space is a bad thing for Concord grape juice. An old idea to the effect that the glass itself had a bad effect on the juice seems to be exploded. Soft glass, hard glass and pyrex glass do equally well.

"The Preservation of Grape Juice. I. Pasteurization of Concord Grape Juice," by Carl S. Pederson, *Food Research*, 1, 9, 1936; II. "Factors Controlling the Rate of Deterioration of Bottled Concord Juice," by D. K. Tressler and C. S. Pederson, *Food Research*, 1, 87, 1936.

New Bacterium Found in "Sick" Wines

SPOILAGE is usually called a "disease" in a winery. "Diseased" wines are "sick" wines, and the cause is usually a microorganism. Beer also has diseases. So do carbonated beverages, bottled olives, fruit juices, canned foods, canned syrups. The name is different, however. In beer and wine it is known as "disease." In other liquid foods it is just plain ordinary spoilage.

Some brewers and vintners are "nasty nice." They hate the use of the term "diseased." They think the public will get the wrong idea that the disease of the wine or beer is something that will cause disease in human beings. Which, of course, is not so at all. Bacteria that make human beings ill will not affect wine. And, contrariwise, bacteria that make wines sick will not affect people.

But, sick wines usually taste something awful unless the disease is caught early and remedied. In a winery, if they know their stuff, they know how to recognize what is wrong and what to do about it. Just as a man knows what to do for his sick dog, so does a first-class fermentologist or vintner know what to do to sick wines. All of which is preliminary to saying that it helps a lot to know all about the bacterium that causes the trouble. If the particular bacterium can be identified with certainty it helps make for better quality control.

So when Prof. Cruess and Dr. Douglas announce and describe a new bacterium that causes a wine disease it is an important event. They have called it *Lactobaccillus Hilgardi*. Wine chemists have formerly called similar bacteria "tourne bacteria."

The disease starts with an "undulating" or "silky" cloudiness. Next the volatile acidity rises rapidly, often reaching 0.3 grams per 100 cc. measured as though it were acetic acid. Then the odor and flavor are adversely affected, beside the extreme souring. It tastes and smells "mousy" and is only fit for low grade distilling material for cheap alcohol.

Sulphur dioxide is used to treat the wine but this article does not go into that phase of vinification.

"A Lactobaccillus from California Wine: *Lactobaccilus Hilgardi*" by H. C. Douglas and W. V. Cruess. *Food Research*, 1, 113. 1936.

Reheating Custard-Filled Pastries to Make Them Safe

THE danger to public health from contaminated custard-filled pastries is so great that many communities refuse to permit the sale or manufacture of these pastries in the warm summer months. Refrigeration has helped, but it is not a complete solution unless the retail store *and* the housewife also keep them under refrigeration.

A new method has been developed to solve this problem. The plan is to pasteurize the cream puffs or eclairs after they have been filled. This is done by putting them into a hot oven. Cream puffs can stay in the oven at 450 deg. F. for up to 20 minutes without excessive browning. Eclairs could stand it for 25 minutes without marked changes in the shell.

The effect of this oven pasteurization is to destroy all the *staphylococci* in the custard (they were purposely inoculated in these tests). Consumer tests of reheated pastries has been very satisfactory.

The Control of Staphylococci in Custard-Filled Puffs and Eclairs" By Stritar, Dack and Jungewaelter, *Food Research*, 1, 237. 1936.

Dairy Orange Beverages Quickly Lose Vitamin C

DAIRY plant operators often distribute an orange beverage made up from an orange concentrate. One of the claims often put forward to sell the beverage is its Vitamin C content. A test was made to see how long the Vitamin C lasted. This is important because many dairy plant operators do not make up the beverage fresh every day for the trade.

While storage at 40 deg. F. prevents rapid loss of the Vitamin C, there is, nevertheless, an appreciable loss. At room temperature the loss is much more rapid. The authors conclude that many dairy orange beverages cannot be considered as satisfactory substitutes for fresh oranges or canned orange juice as carriers of Vitamin C.

The loss of the Vitamin C on storage at 40 deg. F. for 44 hours was 30.3 per cent and 48.1 per cent on different brands of orange products; and at 75 deg. F. the loss in 44 hours was 89.7 per cent and 90.0 per cent in the same products.

"Vitamin-C Content of Dairy Orange Beverages" By Mack, Fellers, MacLinn and Bean. *Food Research*, 1, 223. 1936.

Quick Method of Quality Control For Tomato Paste Manufacture

HERETOFORE, the use of the refractometer, to measure the concentration of whole tomato pulp and paste by the refractometer has been confined to the lighter pastes containing not over 20 per cent of total solids. Higher concentrations were so dry that no free serum (liquid) could be gotten out on which to make the test.

It is very important to have a quick way to test the concentration of a batch because it has to be done on the run. While the stuff is evaporating in the vacuum pan the operator needs to know how far he has cooked it down. And he cannot wait very long or the concentration may vary all over the lot.

The new method gets around the old

difficulties by mixing 50.00 grams of the paste with 100.0 cc of water at 77 deg. F. Then some of the clear liquid is obtained by filtering. This is tested in a refractometer and the reading is made at once. There are twelve pages of data showing the analysis that corresponds to various refractometer readings.

Control of Concentration in the Production of Tomato Pulp and Paste" By H. L. Sipple. Food Research, 1, 145. 1936.

Coffee Roasted in Glass

WE'VE had vacuum-packed coffee, dated coffee, flaked coffee, and just ordinary coffee. Now, according to U.S. Patent No. 2,043,443, issued June 9 to George L. N. Meyer, Milwaukee, Wis., we may have coffee roasted in the sealed container in which it is to be marketed.

According to the patent, raw coffee beans contain an "astringent principle" and an "aromatic principle." The "astringent principle" is removed by heating the beans to a temperature ranging from 250 to 275 deg. F. and holding for 15 to 30 minutes.

The "aromatic principle" is claimed to be retained at this temperature range but disappears quickly after the beans are heated to roasting temperatures. Loss of the "aromatic principle" is prevented by roasting the preheated coffee after sealing it in market containers. For roasting, the beans may be whole or ground.

The preferred containers are of glass such as bottles with a crown seal which will withstand the heat treatment and the pressure developed during roasting. Glass permits visual check on degree of roast. Sealing before roasting prevents loss of "aromatic principle" and rotating or agitation of container and contents during roasting helps to get a uniform roast on contents of each container. Oxidation during roasting is kept at a minimum by removal of as much air as possible during filling of container.

Tenderized Meats

TOUGH roasts and steaks may become as extinct as the dodo if the process covered by U.S. Patent No. 2,043,392 is generally used throughout the meat packing industry.

Granted to Levi Scott Paddock and Cleo A. Rinehart, Chicago, Ill., this patent reveals how all types and varieties of meat may be made as tender as the choicest cuts in one to five days without altering or detracting from other desirable qualities of the meat. The patent was granted June 9 and is assigned to Industrial Patents Corp., Chicago, Ill.

There is nothing new or novel about the use of dilute solutions of such enzymes as trypsin, pepsin, and papain for this purpose. The patentable feature of their use lies in the method of application.

If the entire carcass is to be treated, customary slaughter house procedure is followed up to the removal of the viscera. Before removal of the entrails, tube connection is made between the heart artery (aorta) and the supply tank of a fresh enzyme solution (water solution of papain). The dilute solution is pumped into the empty blood-circulatory system until the capillaries are fully filled.

In case only a portion of the carcass is to be treated the main artery leading to that particular portion of the carcass is connected with the enzyme supply. Blood vessels leading from the portion are tied at their cut ends to prevent loss of solution and to cause the building up of enough back pressure to fill capillaries to their fullest capacity. By so doing the enzyme solution is brought in contact with the connective tissues of the meat where it is held until the desired degree of tenderness is obtained. During the tenderizing the meat is held under refrigeration to prevent spoilage.

By this method the tenderizing period is cut to a period of one to five days and loss from mold is cut to zero. Tenderizing by normal aging depends upon the activity of natural-occurring protein-attacking enzymes under controlled refrigeration and high humidity conditions.

Packaged Sauerkraut

No longer will packers of sauerkraut, pickles, and olives have to choose between bulk packaging in hogsheads or barrels and retail packaging in metal cans or glass jars.

As described in U.S. Patent No. 2,044,245, granted June 16 to Ross C. Irons, Bellevue, Ohio, these commodities may be packaged in consumer units of definite weight before being brine packed in hogshead or barrels for storage and shipping.

The package consists of a bag or pocket made by folding a sheet of vegetable parchment and seaming the two sides. When filled with the desired quantity of solids the bag is closed by sewing the open end. Except for sauerkraut, these packages may be waterproofed by paraffining the seamed edges. As sauerkraut may continue to ferment the packages are likely to burst unless the gas is allowed to escape through the holes made by the sewing needle.

Being flexible in shape and uniform in dimensions these packages are closely packed into hogsheads or barrels and covered with brine.

In this way the packer gets the advantage of storing or shipping in bulk containers and the retailer is spared weighing difficulties. At all times the contents of the packages are protected against spoilage by being covered with preserving brine.

Stabilized Wines and Vinegars

How to make clarified wine and wine-vinegar stay that way has long puzzled grape juice fermenters. To Lawrence G. Saywell, Berkeley, Calif., has been granted U.S. Patent No. 2,043,713, covering the use of bentonite for this purpose.

The grade of bentonite used should have high jelling strength, low iron content, and fine powder form (at least 85 per cent through a 200 mesh sieve). That known as Clay Spur bentonite from Wyoming is a particularly suitable grade.

Bentonite may be added to the wine or vinegar in dry form in proportions ranging from 1 part per 100 parts of wine or vinegar to 1 part per 10,000 part of wine. Generally a 1:1,500 ratio gives best results for vinegars while 1:1,000 is the ratio recommended for wines. For fairly clear wines a 1:2,000 ratio is enough.

When a vinegar contains considerable suspended material, the bentonite treatment may be preceded by the addition of 1 part dry casein to 2,000 parts of vinegar with or without the help of 0.1 per cent of filter aid.

Wines and vinegar, which show tendency to recloud after the usual bentonite treatment, may be stabilized for brilliant clarity by being heated to and kept at 150 deg. F. during the treatment. Samples treated at temperatures ranging from 100 to 175 deg. F. show no change in clarity after three years.

If preferred, the bentonite may be added as a 5 per cent suspension in water or previously clarified wine or vinegar. In all cases the wine or vinegar being treated is agitated during the addition of the bentonite.

Improved flocculations of suspended matter may be obtained if small quantities of aluminum oxide be substituted for part of the bentonite usually required. With 5 per cent of aluminum oxide the bentonite used may be cut to 20 per cent. Initial flocculation is slowed up when the aluminum oxide is used but the total time for flocculation is shortened.

Bentonite is thought to carry a negative electrical charge when in colloidal suspension and to have specific action on the iron content of the wines and vinegars treated.

PLEASE NOTE: Most of these digests cover only parts of the original articles, and interpret and emphasize those features which the editors consider useful to operating men and food engineers. These are not scientific abstracts and research workers will, of course, refer to the original publications.—*Editor.*

ANSWERS TO PLANT QUESTIONS

What conditions of storage for raw foods and supply materials do you recommend for the avoidance of molding?

Keeps Storeroom Clean and Dry

FORTUNATELY the pretzel industry is not confronted with the very annoying mold evil. However, we do take exceptional precaution in the storing of all materials from which our products are made.

Our flour is carefully stacked on wooden skids not more than five sacks high nor more than fifteen sacks on each skid. This method allows the air to circulate freely between the skids as well as about them. Our store-room is swept, believe it or not, twice a day, thereby eliminating any possible chance of flour dust accumulating in and about the store-room. Our store-room is free from excessive heat and moisture. This condition is rather difficult to obtain in a pretzel bakery. However, we have been very fortunate in the past and feel that the precautions we take have paid us handsome dividends due to the fact that a case of mold is very rare in our plant.

The surest way, in our opinion, to fight mold of the various types is to keep the store-room and makeup departments as clean as is humanly possible and as free from excessive moisture as feasible. It is almost impossible to grow mold spores without excessive moisture. Fresh air, sunshine and cleanliness are the best preventives that we know of.—PHILIP TALBOTT, *American Cone & Pretzel Co., Philadelphia, Pa.*

Keeps Storage Spaces Cool

OUR PLANT storage practices are such that we are not troubled by molding of raw materials. A few general remarks regarding storage methods may answer the question of molding in basement storage.

In storing raw materials for food manufacture one should always take into consideration the possibility of mold growth. The conditions favorable for mold growth are well known to the practical plant manager. In general, the most important of these conditions contributing to mold growth are moisture and warmth. Storage spaces should be cool and dry, and necessarily free from insect and rodent infestation. All moisture possible should be eliminated from storage rooms if molding of fruits, nuts, cocoa beans and such is to be prevented. Through proper insulation excessive "sweating" of storage room walls can be prevented. To facilitate thorough cleaning (1) the room should be well lighted, (2) walls and ceiling should be smooth and well painted, (3) floor drains should be provided. Periodic washing and scrubbing of the entire storage space should be practiced. The washing operation should be followed with a thorough spraying with a hypochlorite solution of the proper strength. This treatment followed by thorough drying will greatly tend to decrease the danger from spore infestation and subsequent mold growth.

In storage spaces not artificially conditioned to maintain a low temperature and low humidity it may be advisable to install a small fan to provide air circulation and thus eliminate "dead" air pockets. The use of shallow pans containing commercial calcium chloride may be an acceptable and cheap method for reducing the moisture content of the air in small storage chambers. The installation and use of the ordinary wet and dry bulb hygrometer should suffice as a means of checking the temperature and humidity of the storage space.

The ideal method for insuring the best provisions for mold growth prevention would be the installation of air conditioning equipment. The maintenance of proper storage conditions will solve the molding problem. Automatic air conditioning, however, is usually too expensive an undertaking for the small plant.

The plant manager can do much to decrease his spoilage problem through molding by the careful handling of the raw materials through (1) proper processing when possible, (2) proper packaging for storage (e.g. the use of air-tight containers), and (3) avoidance of "overstocking" of perishable items. In certain cases, preliminary fumigation of highly perishable and expensive raw materials is strongly recommended.—OTTO H. WINDT, *E. J. Brach & Sons Co., Chicago, Ill.*

Recommends Dry Storage With Ventilation

AS A GENERAL proposition we would not recommend the storage of gelatin or any gelatin product in any place where there is a continuous high humidity or any danger of dripping of water. It is our practice and our recommendation that any such materials should be stored in a dry warehouse with sufficient ventilation to prevent any difficulty of this kind.

So far as gelatin itself is concerned, if there is no actual contact with water, a high humidity will lead to an increase in the moisture content just as it would in the case of paper, textiles, or other such materials but otherwise would do no harm. Certainly no cartons, liners, or other packaging materials which will come in contact with edible gelatin should be stored under such conditions that they will become contaminated with mold growth or spores.—JAY BOWMAN, *U-Cop-Co Gelatine, Calumet City, Ill.*

NEXT QUESTION

What method do you find most satisfactory for storing flavor and color ingredients? How do you supply them to the mixing department for the mixes? What checks do you employ to assure that the proper quantities are used?

THE PLANT NOTEBOOK

FIVE DOLLARS WILL BE PAID FOR BRIEF STORIES WHICH ARE SUITABLE FOR USE IN THIS DEPARTMENT. SKETCHES OR PHOTOS SHOULD BE PROVIDED WHENEVER POSSIBLE.

Protecting Conveyors

MANY food plants employ complex conveying systems. Should any one of the individual conveyors in such a system break down, production delays and waste of material may result. Unless some provision is made to stop all of the system when any part fails, material may pile up and do considerable damage to adjacent conveyors.

Electrical interlocking devices are usually employed to prevent this. By interconnecting the control and the protective devices of the motors driving each conveyor, proper sequence in starting is assured and protection against motor failure is provided.

In many cases, however, further protection is necessary. Belts between motor and conveyor may jump off or, where a gear drive is used, shearing pins may break, without affecting the motor protection devices. Interlocking of motor protection devices is then useless, so far as protection of other parts of the conveyor system is concerned.

Where the cost can be justified, complete protection can be secured by using centrifugal relays or switches in the electrical interlocking system. These units, mounted directly on the conveyor drive-shafts, are designed to maintain contact only when the shaft is revolving. When shaft rotation stops the circuit is broken. This provides for safety of the conveyors and proper performance of the electrical interlocking system under all service conditions.—S. H. COLEMAN, *Roanoke, Va.*

Condensate Savings

IN ONE of the plants of a company operating a number of canning factories, all of the condensed steam, both from the high pressure and low pressure processes, was returned to an open feed water heater. This is a wasteful practice. But it is one that can be found in many plants in the food industries, as well as in many other industrial plants using process steam.

To correct this, the necessary equipment was installed to return the high pressure condensate directly to the boiler. The plant then found that four of its boilers would produce all the necessary steam. Before the change, five boilers were needed and they had to be forced to supply the steam. This improvement indicates a fuel saving of 20 per cent. Among the other benefits that came from the change were purer feed to the boilers and better operation of traps.

The theoretical basis of this improvement is simple. One pound of condensate from steam at 125 lb. pressure (the presure at which the plant operates) contains 305 Btu., while one pound of condensate from steam at atmospheric pressure contains 180 Btu. These amounts of heat correspond to temperatures of 336 deg. F. and 212 deg. F. When the condensate from the high pressure steam was reduced to atmospheric pressure in the open heater, the loss was about 125 Btu. per pound, or 125 deg. F. of temperature. If the temperature of the feed water was already 212 deg. F., then this heat was lost in the form of flash steam, which escaped through the heater vent. The loss resulting amounted to about 40 per cent of the heat in the high pressure condensate and about 15 per cent of the weight of condensate returned to the heater.—N. T. PEF, *Chicago, Ill.*

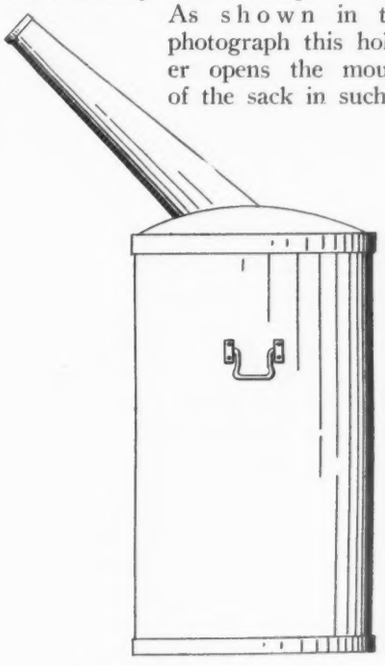
Broken Glass Receptacle

THE SKETCH shows improvements in a receptacle for cracked or broken bottles, as used around plants that use glass containers for their product.

Most bottling plants keep what are known as "glass cans," near the operator who places dirty bottles on washing machine and also at the discharge end of the machine. During the operating day a large number of damaged bottles are rejected and thrown into these cans. Throwing them into the can causes them to shatter and the small bits of glass fly out of the can and are strewn over the floor. The open can with the mass of broken glass and the glass on floor about the can forms a very unsightly mess. The special type of cover, shown in the sketch, will correct this fault. The can may be placed at a point where it is not so conspicuous, and with the proper length and angle to the tube that is attached to the cover of can, the mouth of tube can be placed in a convenient position for the operator to dispose of rejected bottles by placing them in it. They in turn will slide down the tube into can. Extra cans should be available and the full can can be replaced with an empty one, using the same cover with tube attachment. This arrangement works very well—F. E. FOWLER, *Athens, Ga.*

Sack Holder

A CONVENIENT device for holding sacks while they are filled can be readily made in the plant shop. As shown in the photograph this holder opens the mouth of the sack in such a

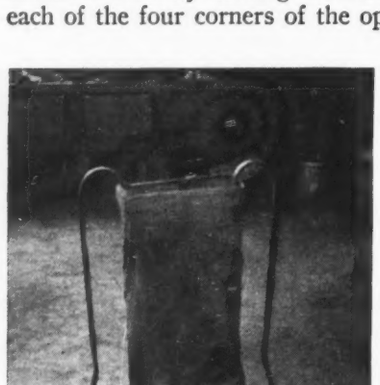


Receptacle for broken glass.

way that it is easy to insert, or for that matter to take out, any products ordinarily packed in a sack.

The holder has a base of channel iron 25 in. long and is 3 in. high and 1 ft. wide. Slots are cut at each end for the sack holding springs which are supported by four cross-pieces of ¼x2 in. iron placed on the underside of the channel and attached by means of countersunk, flathead, ⅜ in. diameter bolts.

The springs are made of ¼x½ in. spring steel. To their upper ends holding arms for the purpose of keeping the sack mouth open are welded. These arms are hooked at the end into a short claw and thus provide means of securely holding the sack at each of the four corners of the open-



Sack holder.

ing. The springs themselves are so shaped as to stand apart when not in use, thus providing sufficient tension for holding the bag securely. The heavy base is for the purpose of preventing a filled sack from tipping. —JIMMY BRADFORD, *St. Louis, Mo.*

Non-Split Piping for Ozone

JUNE FOOD INDUSTRIES, page 307, under the title of "Control of Odors and Mold by Ozone and Ionized Oxygen" stated that one concern used ½-in. brass piping to distribute ozonized air throughout an eleven-story warehouse, and that the pipes split anywhere from 1 to 3 ft., but another company had used ⅜-in. brass pipe for six years without a failure.

Possibly an explanation of this is due to the character of brass pipe used. Some grades of brass pipe, known as high yellow, contain a considerable amount of zinc and tin to make the brass. Another brass pipe is known as red brass pipe which contains little zinc and tin and is practically all copper. Our experience has been that the red brass piping, or piping high in copper content, in this service has had few, if any, failures of the pipe on account of ozone. It is also true that where failure of the ½-in. brass pipe has occurred, in all probability it has been due to the operator of the ozone machine. Apparently he had not paid proper attention to the dehumidification of the air used in manufacturing the ozone.

We have found that ordinary copper service tubing is very much cheaper than either red brass pipe or high yellow. And it can be used successfully without splitting or breaking *if dry air is used for making ozone,* and if the dehydrator is reactivated at proper periods.

We do not advocate the soldered type of fittings on brass tubing. We prefer the expanded end, such as the Hays fitting, which is a compression fitting. We have also found, in using brass pipe, that the failure occurs where threads have been cut.

Your readers will find that copper tubing in dry ozonated air will stand up many years in actual service.

Stainless steel tubing, ½-in. outside diameter, with a wall thickness of 20 gage, is now readily obtainable in lengths from 8 to 22 ft., and suitable fittings, if necessary, can be supplied. With this type of tubing it will be possible to pipe any warehouse for ozone without any corrosion from its use.—H. B. HARTMAN, *Vice-President, Norwood Filtration Company, Florence, Mass.*

Keeping Nuts Tight

IN GENERAL, when a nut is drawn up tightly it is with the expectation and hope that it will stay tight until it is loosened manually. Many nuts work loose from time to time, however. Some of them are only relatively bad actors, and a simple locknut on top will keep them from coming loose, or, if there is no room for a locknut, a spring washer under the nut will be sufficient. In other cases, however, it may not be possible to make nuts in vibrating locations stay put by these methods. Not long ago we read an account of nuts which held the teeth on an ice-crusher in place continually coming loose, and allowing an occasional crusher tooth to drop into the crushed ice. This in itself would not have been so bad, but this crusher was located in the sausage department of a packer, and the crushed ice was carried on into a mixing machine, which was usually wrecked if and when a crusher tooth came along with the ice.

In the case mentioned, the trouble was finally cured by applying an iron cement to the threads of the tooth bolts and nuts. This iron cement has the property of expanding as it sets, and the nuts were held firmly.

Another thing which can be done to insure absolutely that a nut cannot move, is to draw it up tightly, and then, using a small drill of 8-in. diameter or less, drill a hole directly through the side of the nut, and right on through the treaded portion of the bolt, so that a small rivet can be passed directly through the nut and bolt, and riveted lightly into place. With such a provision, there is not a possible chance for the nut to turn on the bolt, yet the rivet can be removed by simply filing the head away, and driving it out with a small punch. —JOHN E. HYLER, *Peoria, Ill.*

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Safety Guard

TO provide a guard over an eccentric drive which must be adjusted frequently, a simple welded construction gives good service. Such a guard is shown in the photograph which pictures an ice cream brick cutter.

The guard is pan-shaped, with a diameter of 14 in. and a depth of 5 in. Two bolts are used to support it, that shown on the right of the picture serving as a pivot on which the top of the guard swings. This permits the guard to be opened so that adjustment can be readily and easily made. The bolt on the left is fixed to the machine frame and receives a hook on the top section of the guard so as to hold the top in place.—CARL RICHARDS, *Chicago, Ill.*

Box Lid Control

SAVINGS are made in the box of dry ice used in packing and delivering special orders at Hage's, Ltd., in San Diego, Calif., through the use

of a simple device. The dry ice is kept in an insulated box of 600 lb. capacity. The lid of this box is at the top, opening upward.

In order to insure quick opening and closing, so that the least possible amount of heat is admitted to the box, we constructed the arrangement shown in the accompanying photograph. This consists of a counterweight sufficiently heavy to balance the weight of the box lid. The counterweight is attached to the lid by a cable, carried over pulleys attached to a frame or bridge above the top of the box.

The bridge is made of 2x2x$\frac{1}{2}$ in. angle iron, bent to dimensions with an acetylene torch. The lid handle has a $\frac{1}{4}$ in. cold rolled ring brazed on it, to retain the cable in a central position.

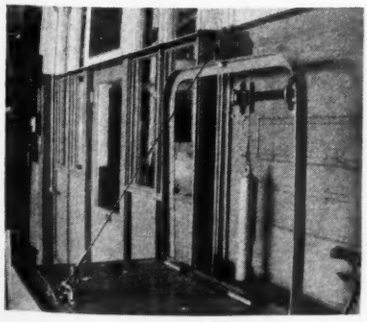
With this arrangement the lid is easily and quickly opened and closed. And there are no smashed fingers.—BILLIE BURGAN, *San Diego, Calif.*

Tarpaulin Truck Cover

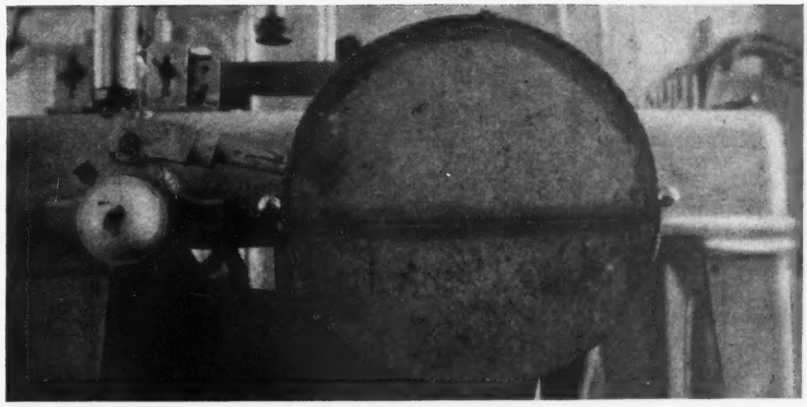
A CONVENIENT method for attaching a tarpaulin for the protection of perishable goods while in trucks, is shown in the accompanying photograph. In this particular case the tarpaulin is used to cover the cream and butter compartment of a wholesale milk truck.

The fastening is made as follows: A strip of 1$\frac{1}{2}$x1$\frac{1}{2}$x$\frac{1}{8}$ in. angle iron is drilled with six holes of $\frac{11}{16}$ in. diameter each. This angle iron is then fastened to the top of the compartment or to some similar position on the truck by means of wood screws.

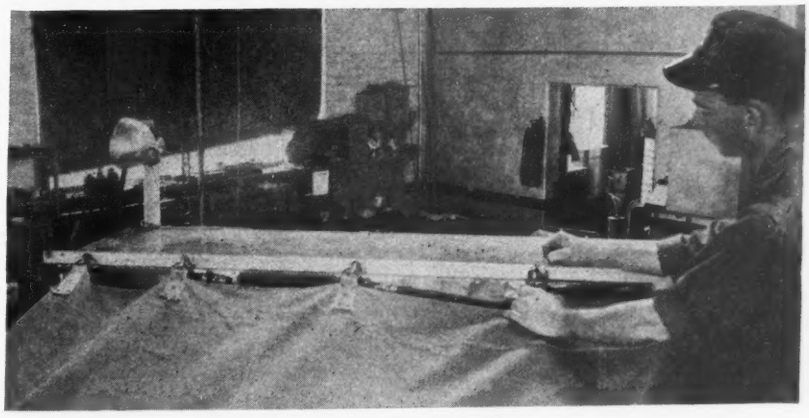
For holding the tarpaulin, the small hooked ends of canvas snaps are inserted through the holes. Rings, sewn or rivetted to the tarpaulin are then snapped into position in the snaps, which have shouldered necks and therefore cannot be pulled through the holes of the angle iron.



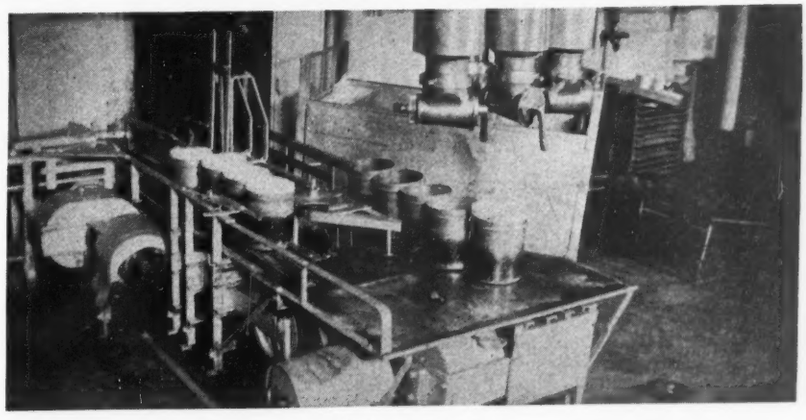
Box lid control.



Safety guard for eccentric.



Attachment for tarpaulins.



Control for can conveyor.

With this arrangement the tarpaulin is easily released for washing.—GEORGE KELLEY, *El Paso, Texas.*

Conveyor Control

IN filling ice cream cans, savings in labor and improvements in efficiency have been effected by the use of a can control device. This consists of a turnstile stop on the conveyor along which the cans moved, arranged as shown in the accompanying photograph.

When the operator stands in position for drawing ice cream from the valves over the conveyor, he can start the cans on the moving conveyor chain on to the table by pulling the lever which controls this turnstile stop. He can stop the cans just as easily by pushing the lever again.

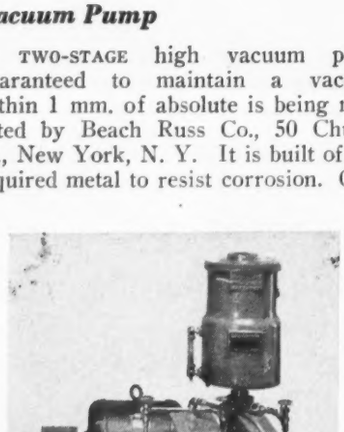
Another lever rod with a handle like the one seen under the table center is provided under the right side and fastened to the star stop bell-crank beneath the star.

Before this control was installed, an extra operator was required to manage the cans during the filling operation. Also, the job did not proceed as easily or as efficiently as it now does.—AL SUTTON, *Kansas City, Mo.*

NEW EQUIPMENT FOR FOOD MANUFACTURERS

Vacuum Pump

A TWO-STAGE high vacuum pump guaranteed to maintain a vacuum within 1 mm. of absolute is being marketed by Beach Russ Co., 50 Church St., New York, N. Y. It is built of any required metal to resist corrosion. Con-



Two-stage vacuum pump

struction is without valves, gears or springs.

In this design the possibility of leakage has been cut down by casting the two cylinders integral, and thus avoiding the use of connecting piping and fittings which might leak. This design also gives compactness. Standard sizes are 8, 15, 30, 55, 100 and 200 cu. ft. per minute. Larger sizes are built to meet special requirements.

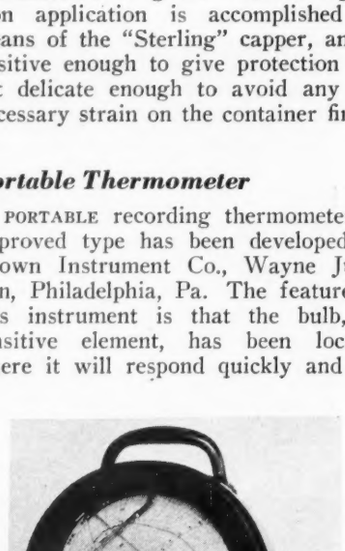
Glass Container Closure

A RE-SEAL closure, that opens easily and re-seals tightly, has been developed by Reynolds Metal Co., 19 Rector St., New York, N. Y. Known as the "Sterling" closure, the seal is provided with an annular bead which can be compressed from .030 to .035 in., or one-third more than the tolerance limits allowed as necessary in the manufacture of glass. This compression application is accomplished by means of the "Sterling" capper, and is positive enough to give protection and yet delicate enough to avoid any unnecessary strain on the container finish.

Sterling closure as applied to bottle

Portable Thermometer

A PORTABLE recording thermometer of improved type has been developed by Brown Instrument Co., Wayne Junction, Philadelphia, Pa. The feature of this instrument is that the bulb, or sensitive element, has been located where it will respond quickly and accurately to changes in the surrounding temperature. Mounted in the clear, the mercury-filled bulb is subjected to the natural air currents and, therefore, records true temperatures. It is also claimed that the new design results in greater sensitivity since the measuring system is in no way affected by the temperature of the instrument case. The instrument is particularly designated for use in cold storage plants.



Portable Thermometer

Controlled Heater Valve

A HALF INCH CONTROL VALVE for use with heaters that are heated by steam, has been placed on the market by Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pa. This valve is of the throttling type and is operated by a thermostat of bulb and bellows design. It is automatic in action, opening when the temperature of the liquid in the heater falls below the desired point and closing when sufficient heat has been added to re-establish the operating temperature. It is designed for use with steam pressures up to 125 lb. per sq.in. It may be installed on the outlet end of the heating coil to handle the condensate; or on the inlet end of the coil.

Water Economizer

A DEVICE which is said to reduce the water consumption of air conditioning systems by 99 per cent or thereabouts, depending on operating conditions, has been developed by the York Ice Machinery Corp., York, Pa. It is called the York Economizer. In design it is a combination of a forced draft cooling tower and a refrigerant condenser.

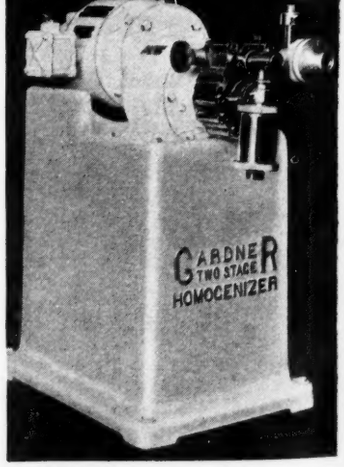
In this device a fan passes the outside air to a bank of bare pipe coils over which water trickles in a direction opposite to the air flow. A refrigerant is condensed inside the coils and flows by gravity to a liquid receiver built in the base. The cooling water is recirculated from the drain pan by a pump. Loss of water by evaporation is made up by an automatically controlled float valve.

The machine is designed for installation either indoors or outdoors. When used indoors, it is provided with ducts to bring in the outside air and exhaust the air that has passed through to the atmosphere.

Two-Stage Homogenizer

DESIGNED to handle such liquids as milk, cream, buttermilk, chocolate milk and ice cream mix, Gardner Dairy Equipment Corp., Grand Rapids, Mich., has introduced a two-stage homogenizer. This operates at lower pressures than those ordinarily used for this operation, and hence can be sold at low price.

In operation, the liquid under pressure is forced against a cone and into a



Two-stage homogenizer

first circular groove. From there it is forced through finely graduated slots into a second circular groove. These operations complete the first stage. Next, the liquid still under pressure, is forced through another series of slots and into the outlet holes, completing the second stage of homogenization.

The pressure range is from 150 to 550 lb. per sq. in., depending on the liquid being treated. Power ranges from 1 to 3 hp. The machine has been designed for easy cleaning.

Cleaner for Dry Materials

FOR CLEANING green coffee and similar free flowing materials, Jabez Burns & Son, Inc., 43d St. and 11th Ave., New York, N. Y., has developed a machine which is claimed to be simpler and more efficient and economical than previous equipment of this nature. Separation is effected by differences in unit weight of the material, thus permitting a definite separation between the product and any foreign matter. The material first passes through a feeder which feeds it to the machine in a single layer. This layer is then broken up so as to be uniformly spaced over the cross-section of the riser pipe into which it flows.

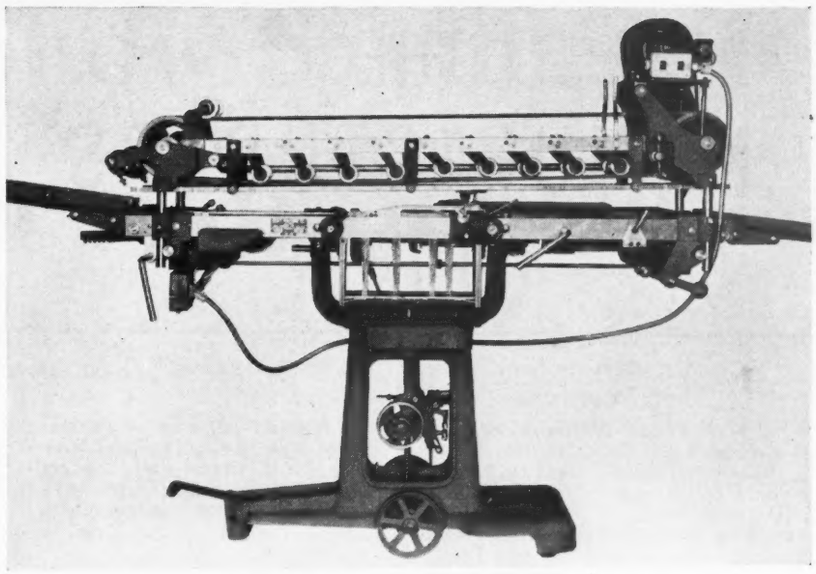
A stream of air passes upward through this material and its velocity is so regulated that all particles which are even slightly lighter than the product are carried upward to be removed in a cyclone collector. The method is said to be particularly effective in removing lint, fluff, sticks, string and similar materials.

Stake Trucks

A NEW RANGE of stake trucks designed for the delivery of grocery products has been announced by the Reo Motor Car Co., Lansing, Mich. These trucks are equipped with streamlined French-type cabs. They are powered with the Reo Gold or Silver Crown engine, depending on the size of the truck.

Streamlined Trailer

FOR city delivered service, Fruehauf Trailer Co., Detroit, Mich., has recently designed a fully streamlined trailer with steel panel body. This is for use with a 1½-ton tractor. It has a fully-rounded front, cutting down wind resistance and permitting close coupling. Hinged at the fifth wheel, the tractor can turn at 90 degrees to the trailer, giving added flexibility in traffic and at the loading platform.



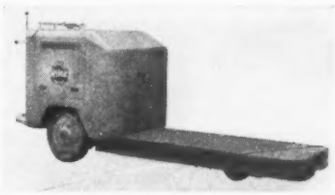
Quick change adjustable labeler

Quick Change Labeler

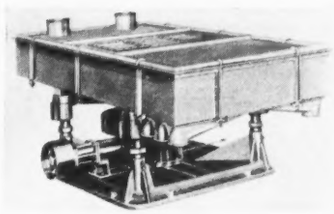
TO PROVIDE for easy and speedy changing from one size of can to another, Burt Machine Co., Baltimore, Md., has developed its "Wide Range Quick Change Adjustable Labeler." In this design a number of adjustments formerly done individually have been consolidated. Turning a handle until two pins touch the flanges of the can sets the complete top frame for the correct diameter setting. Turning another handle until gages touch each end of the can sets the conveying belt, pulleys, belt tighteners and guide rod. The pick-up glue pot is moved by a handle and the pasting device is also moved by turning a handle. The turning of another handle moves the label guide and table in or out for the size of label that is to be applied.

Lift Trucks

BAKER-RAULANG Co., Cleveland, Ohio, recently announced two new series of elevating platform trucks, the type EV-3, of 6,000 pound capacity; and the type EX-2, of 4,000 pound capacity. Both trucks are of the vertical lift type. Type EV-3 has a chain type elevating unit, while type EX-2 employs a screw-and-nut type elevating unit. Standard platforms on either truck are 26¼ in. wide, 55 in. long and 11 in. high. Platforms up to 84 inches long can be supplied if desired.



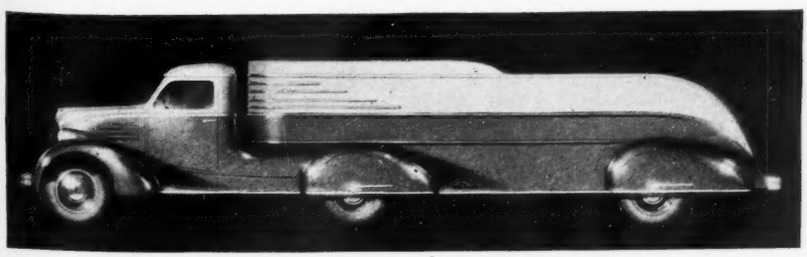
Vertical lift elevating truck



Rotor Sifter

Sifter

SPROUT, WALDRON & Co., INC., Muncy, Pa., recently introduced a new model of sifter, called the "Roto." The machine is designed to make accurate separations of materials by means of screens from 2 to 250 mesh. The device operates by imparting a circular motion to the entire screen surface. It is claimed that it lowers screening costs and gives more capacity per square foot of screen surface than was obtained with previous designs.



Fully streamlined trailer

THE MANUFACTURERS OFFER

Food Plant Equipment

1. BAKERY OVENS——Read Machinery Co., Inc. Indirect heat single or double lap traveling tray ovens for bread baking are discussed in a 12-page bulletin numbered V-126.

2. COFFEE ROASTERS——Jabez Burns & Son, Inc. Industrial applications of the Thermalo coffee roaster by various industrial companies are discussed in a 15-page bulletin entitled "Who are Using Thermalo."

3. CONVEYORS——The Lamson Co. A 20-page illustrated catalog shows applications of Lamson conveying equipment of various types for handling cases, boxes, shipping containers, kegs, barrels and similar packages.

4. MATERIALS HANDLING EQUIPMENT ——Lewis-Shepard Co. Circular No. 318 illustrates various types of lift trucks, skid platforms, stackers, elevators, and other equipment made by this company.

5. PUMPING EQUIPMENT——Worthington Pump & Machinery Corp. Bulletin W-423-B3 describes vertical, triplex, single-action power pumps, equipped with multiple V-belt drives.

6. ROLLER MILL EQUIPMENT——Allis-Chalmers Mfg. Co. Roller mill machinery for grinding, crushing, flaking and cubing grain, salt, and other products are discussed in Bulletin No. 1264, a 32-page illustrated publication.

7. SLICER KNIFE SHARPENER——Oliver Machinery Co. The Crossley slicer knife sharpener for bread slicers, now being marketed by this company, is described in a recent folder.

8. WATER HEATING EQUIPMENT—— Fulton Sylphon Co. Bulletin No. 40 discusses and illustrates water heaters of the hot-cold water mixing type and of the steam-water mixing type.

9. WEIGHING AND MEASURING EQUIPMENT——Blaw-Knox Co. Bulletin No. 1529 illustrates weighing and measuring devices and steel storage bins for granular and liquid materials.

Packaging

10. LABELS——Lehmann Printing & Lithographing Co. Two large catalogs of stock label designs, profusely illustrated in color: one of 120 pages showing designs for carbonated beverage labels; one of 190 pages showing labels for wines, liquors and fermented beverages.

11. SHIPPING CONTAINERS——David Weber & Co. An "inner-joint" corrugated fiber shipping container for canned goods is described in a new folder.

Plant Supplies and Accessories

12. DIESEL ENGINES——Worthington Pump & Machinery Corp. Bulletin S-500-B30 describes Type B, vertical, four-cycle, direct injection diesel engines.

13. FANS, BLOWERS AND UNIT HEATERS ——Autovent Fan & Blower Co. Bulletins illustrating and specifying fans, blowers and unit heaters made by this company are now being distributed, bound together in a loose-leaf folder.

14. POWER TRANSMISSION EQUIPMENT ——Link-Belt Co. Catalog No. 1500 is a 208-page general catalog listing and specifying the power transmission equipment manufactured by this company.

Control Equipment

15. CONTROL INSTRUMENTS —— The Bristol Co. Bulletin No. 440 describes this company's new series of "Ampliset Free-Vane" controllers for time-temperature, flow, liquid level, pressure, time-pressure and humidity.

16. CONTROL INSTRUMENTS——Fulton Sylphon Co. Bulletin No. 100 specifies and illustrates various types of pressure regulators manufactured by this company.

Laboratory Equipment

17. LABORATORY EQUIPMENT——Bausch & Lomb Optical Co. Catalog No. D-202 describes the manipulation and use of Abbe and dipping types of refractometers.

Pest Control, Bacteria Control, Cleansers and Sterilizers

18. BACTERIA CONTROL——The Diversey Corp. Three new bulletins as follows: Technical Bulletin No. 125 entitled "The Control and Prevention of Ropey Milk"; a folder describing Silico, a cleanser for food plant equipment; a folder discussing the action of Diversol as a sterilizer for dairy and other food plants.

19. MILKSTONE REMOVER —— Oakite Products, Inc. A new 8-page booklet, describes the removal of milkstone from milk processing equipment with a new material called Oakite milkstone remover.

Chemical Materials

20. SALTS——International Salt Co. A 20-page catalog entitled "Salt Empire" profusely illustrated, describes the plant and properties of this company.

Materials of Construction

21. BRINE TANKS——Lukens Steel Co. A leaflet discusses the use of nickel-clad steel for the fabrication of brine tanks and rock salt dissolvers.

Trucks, Trailers and Accessories

22. GARAGE EQUIPMENT —— Bendix Products Corp. Catalog 11-B is a catalog of the Bendix-Feragen line of instruments and machines for wheel alignment, spring testing, frame straightening and other truck maintenance operations of fleet owners.

Miscellaneous

23. FORMULAS——Glyco Products Co., Inc. Pie fillings, cake mixers, icings, jellies, flavors and marshmallows are the subject of a recipe book recently issued by this company.

24. FROZEN EGGS——Standard Brands, Inc. "The Biography of a Frozen Egg" is the title of a new booklet illustrating and describing the freezing of eggs and the use of frozen eggs in industry.

25. SKIN PROTECTION——The Milburn Co. A folder discusses the causes and methods of prevention of occupational infections of the skin.

G. L. Montgomery,
Managing Editor, Food Industries,
330 W. 42nd St., New York, N. Y.

August, 1936

TO THE READER: Use this convenient form to get the bulletins you need.

Please send me the bulletins indicated by the following numbers:_____

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Employer_____ Your Name_____

Position_____ Your Address_____

Trailers Show Savings Over Rail Deliveries

AN excellent example of the adaptability of tractors and trailers to reduce transportation costs as compared with rail shipments may be cited in the case of the Ontario Biscuit Co., Buffalo, N. Y. The savings effected may be briefly summarized as: A reduction in warehouse stocks by more frequent shipments; the elimination of high carloading costs at the main plant in Buffalo; and a resulting saving in the cost of shipment by motor equipment as compared with rail delivery.

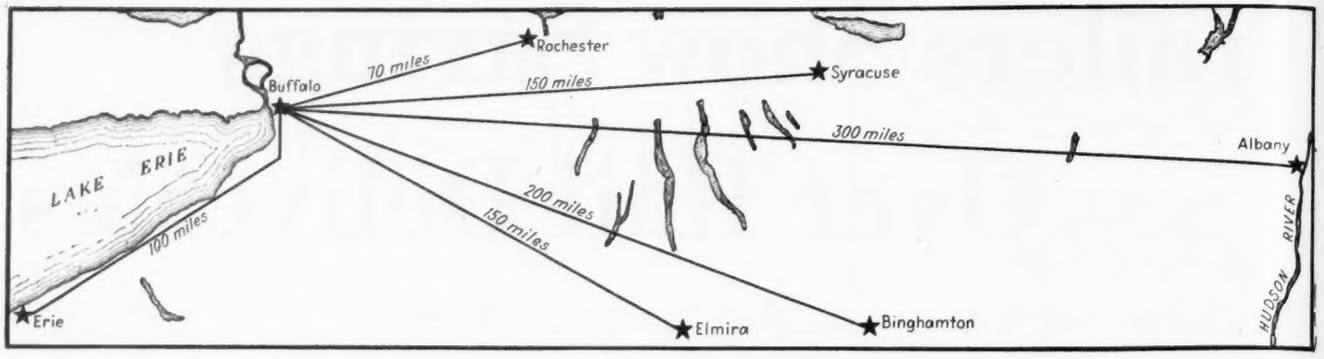
Before the adoption of tractor and semi-trailer equipment, the company's distribution system was more involved and more costly. From the company's main production plant in Buffalo, its products, consisting of soda crackers, biscuits, cookies and cakes, were shipped by rail to six branch warehouses, all within a radius of road of 300 miles. The volume of goods shipped amounted to approximately 154,000 lb. per week. This necessitated the use of seven railroad cars with an average loading of 22,000 lb. each.

As the company's Buffalo plant was not located on a railroad siding, it was necessary to employ two conventional trucks and a loading crew of four men to move the products from the plant to the nearest rail siding and there load the cars. The cost of maintaining this crew amounted to $27 per car or $189 per week and necessitated a double handling of the goods with a resultant loss in breakage before the merchandise cleared Buffalo. In addition, the regular rail rate plus a 3 cent emergency charge had to be paid to get the goods to each of the distributing warehouses which were situated on rail sidings at their respective locations.

A survey of the above method of shipment led the company to believe that a direct shipment by motor equipment to its branches would materially reduce the transportation costs besides reducing the main Buffalo warehouse stocks by more frequent shipments. This estimated saving in cost has worked out in practice through the use of tractor and semi-trailer equipment. The latter type of equipment was employed instead of conventional trucks because of greater load space for a bulky product with a minimum of motor operating expense and because of the ability to load one semi-trailer while another was out on its delivery route.

Accordingly a fleet of three Fruehauf semi-trailers with 24-ft. bodies and two GMC tractors were purchased. This equipment was put into service and operated on a fixed schedule direct from the main Buffalo plant to each of the distributing branches. Each tractor and semi-trailer unit carries an average load of

Three-quarter rear view of one of a fleet of three Fruehauf semi-trailers and two GMC tractors which have shown greatly reduced costs as compared with rail shipments in the distribution of the Ontario Biscuit Co.'s products from its main plant in Buffalo, N. Y., to its six distributing stations. The trailer bodies are fully insulated to prevent chocolate cake trimmings and icings from melting in hot weather and the chocolate from turning white in cold weather. The tractors and semi-trailers are painted yellow with the large lettering in black to provide a contrasting paint layout of exceptional advertising value.



Map of a portion of New York State showing the location of the main plant of the Ontario Biscuit Co. in Buffalo, N. Y., and its six distributing warehouses between which the tractor and semi-trailer equipment pictured on the opposite page has replaced rail shipments at much less expense. The figures shown on the lines to each distributing warehouse location indicate the respective one-way road mileages from Buffalo.

13,000 lb. of baked goods each trip.

The company's six distributing plants and their respective road distances from Buffalo are: Erie, 100 miles; Elmira, 150 miles; Syracuse, 150 miles; Rochester, 70 miles; Binghamton, 200 miles, and Albany, 300 miles. The locations, all in New York State, except Erie, are shown in relation to Buffalo on the accompanying map.

IN operation, each day both of the tractors, with two of the semi-trailers, make one long and one short haul. In all, twelve to thirteen trips are made per week with two trips to Erie; two to Elmira; two to Binghamton; three to Rochester; three to Syracuse and one trip every other week to Albany. Occasionally a surplus of goods going to Albany over and above the semi-trailer capacity is shipped on hired trucks.

Due to the many small packages of which each trailer load consists, it takes from three to four hours to load. This is the reason for each of the tractors alternating in making one long and one short haul per day. While the tractor and semi-trailer on the short haul is out on its run, the third semi-trailer in the fleet is loaded and ready for the short haul tractor to take out on a long haul on the afternoon of the same day. When not on regular runs, all of the equipment is used to bring into the Buffalo plant from the railroad yards such raw materials as flour, sugar, chocolate and other products used in the cracker and cake manufacture.

The tractor making the first long run each day, makes only one trip that day. For example, the 200-mile run to Binghamton takes ten hours one way. The driver takes four hours' rest and sleep during the four-hour period of unloading the semi-trailer at Binghamton and then spends another ten hours in bringing the tractor and empty semi-trailer back to Buffalo. The driver then has 24 hours off duty. No return loads are carried on the trips back to the main Buffalo plant.

Both the tractors and semi-trailers are painted a pleasing yellow with large black lettering to provide a most striking appearance and one of considerable advertising value as shown in the accompanying illustration.

Although many insulated bodies for the preservation of fresh food products have been described in recent issues of FOOD INDUSTRIES, it is unusual to find an insulated body used for carrying crackers and cakes. Yet the Ontario trailer bodies are insulated and it was done for very good reasons.

From experience, the Ontario Biscuit Co. found that in extremely hot weather the chocolate coverings and icings on the cakes and cookies melt and run. In extremely cold weather the chocolate turns white when brought into a warm temperature again. Hence the trailer bodies described herewith are fully insulated.

The semi-trailers are loaded in a garage in which a temperature of 50 deg. F. is maintained. With the insulation as provided, the drop in inside body temperature is not more than 10 deg. to 40 deg. F. with zero weather outside on even the longest 300-mile run.

The insulation employed is 2 in. of Dry Zero on the trailer sides; 2 in. of Waddex made by the Kimberly, Clark Paper Co., Niagara Falls, N. Y., on the roof and 2 in. of cork in the floor.

The bodies, also made by the Freuhauf Trailer Co., Detroit, Mich., have inside dimensions of 7 ft. 3 in. wide; 6 ft. 3 in. high and 24 ft. long.

In operation, the tractor and semi-trailer equipment has shown a gratifying reduction in expense as compared with rail rates in addition to less warehouse stocks; less breakage in handling and fresher goods because of more frequent shipments as previously enumerated.

The rail rates on the company's products are 35 per cent of the first class rates. For example, the first class rail rate from Buffalo to Rochester is 45 cents. Thirty-five per cent of that amount is 15.75 cents per cwt. to which must be added an emergency charge of 3 cents, making the net rate 18.75 cents per cwt. To this total must be added, when shipped by rail, the cost of transporting the goods to the freight yards and loading into cars. At the cost of $27 per car as previously given, this expense amounts to 12.3 cents per cwt. so that the total rail expense to the Rochester distributing warehouse is 18.75 cents plus 12.3 cents or approximately 30 cents per cwt.

THE tractor and semi-trailer cost averages 10 cents per road-mile with an average of 1,500 miles per week. Thus the cost of the 140-mile road trip to Rochester is $14. With an average load of 13,000 lb., this gives a road cost of approximately 11 cents per cwt. or 19 cents per cwt. less than by rail. The difference in cost between rail and road movements to the other distributing warehouses is proportionately the same.

The tractors employed in the work are GMC Model T46 units with 331 cu.in. engines with five-speed gear-sets with direct in fourth and overdrive in fifth gear to give better road speeds.

PRACTICAL PROBLEMS OF TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

Requirements of Truck Brakes; Methods of Testing

Question No. 18

From a safety standpoint, do you believe that:

1. All trucks, regardless of gross weight, should be capable of stopping in the same distance when traveling at the same speed?

2. If so, what distance should this be when traveling at 20 miles an hour?

3. In testing your truck brakes, how is this distance measured?

4. Can it be measured in any other way than by a deceleration meter?

5. Is it possible to obtain equal stopping distances with service and emergency brakes?

6. If not, do you believe that truck manufacturers should provide emergency brakes at equal capacity to service brakes?

Human Factor Enters

REGARDING brakes on heavy trucks, this is a problem which at this time we do not have as we are not using heavy equipment. We do, however, take special pains to keep the brake equipment on all of our cars in good condition, as we believe it is vital to the safety, not only of the general public, but of our own men.

Your questions are really technical, and while they might seemingly be answered in a satisfactory manner by automobile engineers, you will find a big difference of opinion, even among those who are supposed to know what it is all about. Presumably, all new trucks are equipped with adequate brakes, but that is only the beginning. The best brake on earth can be spoiled in the first few hundred miles by a poor driver, so that while the theory and work of the engineers might turn out as nearly a perfect job as possible, yet "Old Man Human Nature" will step in just as soon as the driver takes over the truck, and you have a fine groundwork for an argument.—C. L. JONES, *Automobile Division, General Foods Sales Co., New York, N. Y.*

Decelerometer Effective

THE following are my views on the questions pertaining to brakes:

1. All trucks, regardless of gross weight, should stop in the same distance when traveling at the same speed on the same kind of roads.

2. Traveling at 20 miles an hour, a truck should stop in 20 to 22 ft.

3. By using a decelerometer. This instrument gives a direct reading of the efficiency, irrespective of the speed at which a test is made. This method has been proved to give accurate results.

4. Other methods are:

(a) Measure the actual distance in which a vehicle stops from a specified speed.

(b) Measure the time in which a vehicle stops from a specified speed.

5. No, as emergency brakes are often a small band on the drive shaft and serve only as a parking brake.

6. No. A good service brake is always dependable if working efficiently, and it can be applied quicker than the hand brake.—H. SUNDERMAN, *Stahl-Meyer, Inc., New York, N. Y.*

Best Tire-and-Tube Combination for Wagons

Question No. 19

1. Do tires removed from passenger cars and trucks, because the treads are worn smooth, have sufficient protection against punctures when used with second-grade but new inner tubes for equipping horse wagons?

2. If not, should puncture-proof tubes or puncture sealing compounds be used with worn automotive tires?

3. What is the comparative first cost of such combinations as given above with new tires and tubes?

4. Also, what is the relative freedom from punctures with the old-tire-and-tube combinations and new tires and tubes?

5. Which combination gives the lowest tire cost per mile?

New Tires Cost Less

WE are giving you our experience in equipping horse-drawn vehicles with pneumatic tires:

Tires removed from passenger cars and trucks and equipped with new tubes do not give the service desired. The approximate cost of using four old tires and equipping each with a new tube would be $23.72.

If we used four old tires and equipped them with puncture-sealed tubes, it would cost approximately $36.52 to equip a wagon. This type of tire would no doubt, give very satisfactory service.

If we used four new tires and four new tubes, it would cost approximately $43.32 to equip a wagon and would result in a lower cost per mile. We use a tire measuring 600x16. — CHAS. C. NELSON, *Secretary and Treasurer, Racine Pure Milk Co., Inc., Racine, Wis.*

Smooth Tires Need Protection

THESE are our views on the questions regarding pneumatic tires for horse-drawn wagons:

1. Tires taken off trucks and cars in a smooth condition should last on wagons for a long time.

2. The use of puncture-proof tubes or puncture-sealing compound with worn automotive tires is effective. We feel that protection should be given old tires.

3. As regards the comparative cost of protecting old tires and using new tires and tubes, puncture-sealing compound costs around $4 per tire. New, 6-ply tires, 550x18, with a weight capacity of 700 lb., cost in quantities $11.39, and the new tubes cost $2.03.

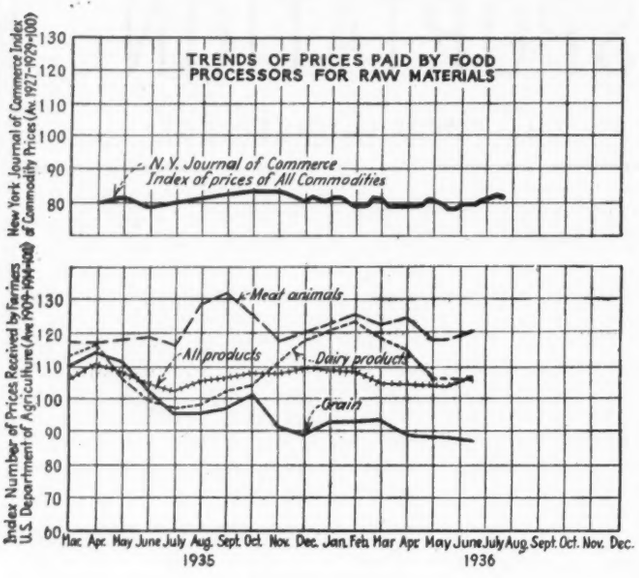
4. There would be some difference in the relative freedom from punctures with old tire-and-tube combinations and new tires and tubes, but on present day streets punctures are very few.

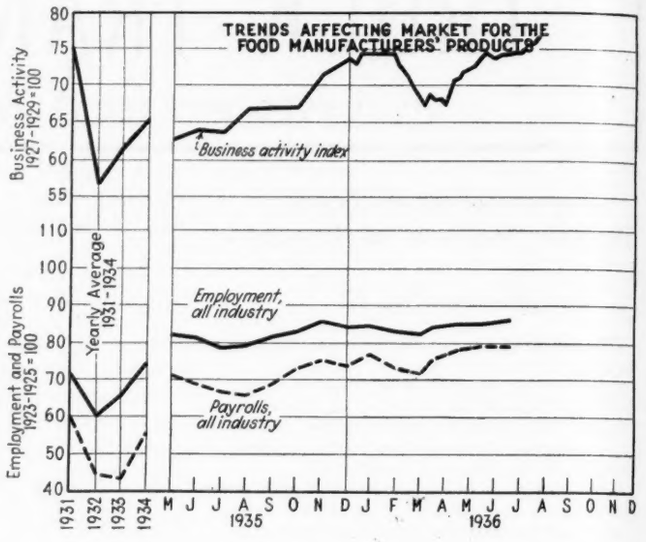
5. The lowest tire cost per mile would be secured from smooth tires and No. 2 tubes with puncture-sealing compound, as the investment would be the smallest. —CHESTNUT FARMS, *Chevy Chase Dairy, Washington, D. C.*

New Tires Economical

WE do not use tread-worn tires on our horse wagons. Therefore, we could not give you comparative costs with new tires and tubes. However, we do know that it is more economical to buy new tires and tubes, and we purchased these for all of our horse wagons. —JOSEPH J. BOBRYTZKE, *National Milk Co., South Bend, Ind.*

BUSINESS TRENDS


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
New York Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
N.Y. Journal of Commerce Index of prices of All Commodities
Index Number of Prices Received by Farmers U.S. Department of Agriculture (Aug 1909-July 1914=100)
Meat animals
All products
Dairy products
Grain
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar Apr. May June July Aug. Sept. Oct. Nov. Dec.
1935
1936


TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business Activity 1927-1929=100
Business activity index
Employment and Payrolls 1923-1925=100
Yearly Average 1931-1934
Employment, all industry
Payrolls, all industry
1931 1932 1933 1934 M J J A S O N D J F M A M J J A S O N D
1935
1936

WEATHER CURTAILS CROPS

OVER MUCH of the best agricultural producing area of the country, too little rain combined with too much heat have produced conditions that approximate those of the 1934 drought. In fact, because this year's unfavorable weather has extended to regions that were untouched in 1934, the results may be even more serious.

In considering this situation, the food manufacturer should always bear in mind that, in spite of the crop curtailment, enough food will undoubtedly be produced to approximate the needs of the country. While scarcity will actually exist in some items; a food shortage is not to be expected. This means that the price structure will be firm, but that with few exceptions, prices are not likely to go to unreasonable heights.

Food and Feed Grains

SO FAR, the most serious effects of the weather have fallen upon the food and feed grain crops. Wheat in the Northwest States, where most of the soft spring wheat originates, has been hit hard, except in Oregon and Washington, where a surplus is expected. In its July 1 report the U. S. Department of Agriculture forecast a spring wheat yield of 126,314,000 bu., which would be only 45.7 per cent of normal. Since that time, the unfavorable weather has continued in Montana, the Dakotas, and Nebraska, so that the crop may be even less. In addition, the quality will be considerably below par. With these expectations, and in spite of an improvement recorded in the winter wheat yield, total wheat production of between 620,000,000 bu. and 640,000,000 bu. is expected, which compares to the estimated requirement of 650,000,000 bu.

Corn, according to this same forecast, stood at 72.5 per cent of normal, compared to a five-year average of 79.5 per cent. At the same time last year, the condition of the corn crop was 67.5 per cent of normal. The yield forecast is 2,244,834,000 bu., and this along with the 400,000,000 bu. estimated to be still on farms from last year's crop, would indicate that the corn supply will be ample. Also, since this report, the corn belt has been visited by drenching rains, and the condition of the crop is expected to be improved thereby.

Oats and other feed grains have also been hurt by the lack of moisture and the burning heat. A crop of about 800,000,000 bu. of oats is expected, which will be about 400,000,000 bu. less than the 1928-1932 average. In 1934, the oat crop amounted to only about 528,000,000 bu. When the carryover of oats on farms from 1935, amounting to 247,000,000 bu., is added to this year's expected yield, the situation is seen not to be serious.

In addition to these main grain crops, rye, barley and other grains have also suffered, and yields are expected to be low.

Animal Products

PASTURES have been seriously hit by the bad weather. This and the lack of water in some regions, has seriously disturbed the situation with relation to meat products, and that at a time when conditions were just beginning to show a recovery from the effects of the 1934 drought. The Crop Reporting Board, on July 21, reported that on July 15 the pasture conditions were only 44.7 per cent of normal, and 5.1 per cent above the conditions that obtained on Aug. 1, 1934. The average condition at this date for the past 25 years has been 81.8 per cent of normal.

Faced with this situation, the Government has again commenced to purchase cattle from the drought stricken areas. As the movement has just commenced its extent cannot yet be forecast, but the initial appropriation for this purpose was $2,000,000.

Dairy production is another branch of the food industries that is experiencing trouble from the pasturage conditions and the short crops of feed grains.

Construction News

	Pending (thousands)	Awarded July (thousands)	Total Awarded 1936 (thousands)
Bakery	$140	$124	$983
Beverages	500	314	3,688
Canning and Preserving	....	77	77
Confectionery	....	....	30
Grain Mill Products	825	37	2,792
Ice Manufactured	....	30	294
Meats and Meat Products	432	437	1,432
Milk Products	1,599	227	904
Miscellaneous	361	317	2,480
	$3,857	$1,563	$12,680

Business Still Gains

In spite of drought and the depressing effects of burning summer heat, business continued to reach for higher levels during the past month. The *Business Week* index shows general business activity to have reached 76.1 per cent of "normal" as of July 25, which was an advance for the month of 1.87 per cent. For the year the rise amounts to 19.28 per cent. For the normally dull summer months, business is showing activity that runs counter to the usual trend, with department store sales up 12 to 14 per cent over last year and mail order houses recording record business. Steel continues at relatively high levels, the usual summer slump not being yet evident, and the continued good sales of automobiles are buoying up other industries besides the steel mills. Electric power consumption continues to soar to new levels.

The U.S. Department of Labor reports a wholesale price rise of 1.9 per cent for all commodities for the five weeks ending July 25, with farm products up 5.17 per cent and foods higher by 0.38 per cent. The upward trend indicated by the weighted price index compiled by the New York *Journal of Commerce* is considerably greater for commodities as a whole, the general index being up only 3.27 per cent for the five weeks ending Aug. 1. General food prices rose 1.24 per cent. Grain, spurred by the drought, showed the large price increase of 27.67 per cent.

Milk flow is reported to be lessening. Unless the early days of August show heavy rains, serious curtailment of milk production will result. Should these rains occur, however, the situation will be considerably relieved because the pastures will recover rapidly, even though the feed crops are lost. Until the cold weather of fall forces the cattle off pasture, milk flow might then hold up.

Beet Sugar

Drought Conditions have also damaged the sugar crop of the mountain states, but as domestic sugar consumption relies mostly on imported sugar, the sugar price situation should not be influenced.

Canning Crops

Bad Weather from the start of the season, in many of the country's most important canning districts, makes certain that the output of many of the most important products will be greatly below pre-season estimates. The packs of peas, corn and tomatoes will be cut by from 15 to 25 per cent. Packs of fruit in Eastern regions will be low from the same causes, but the Pacific Coast canners of fruits are not affected by the drought. Stocks of canned foods carried over from 1935 were not large, and it is possible that some items may be available in supplies that fall short of the demand.

Fresh Fruits and Vegetables

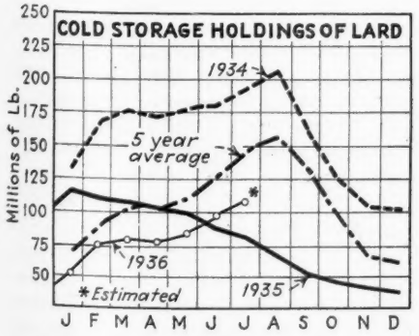
On July 16, the Bureau of Agricultural Economics released a report in which estimates of this year's output of fruits and vegetables for the fresh food markets were given. According to this report, fresh fruits available for the market will probably be about 17 per cent less than last year, and 3 per cent below the average for 1925-1929. Supplies of fresh vegetables are estimated in the report to be about 6 per cent below last year.

General Conditions

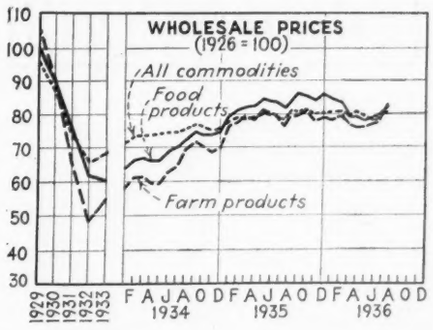
In Issuing the report just referred to, Dr. A. G. Black, chief of the bureau, stated that, although the production of some food crops has been seriously curtailed, the total supplies of foods in general for the twelve months ending with June, 1937, appears to be ample for domestic consumption.

Total food supplies for domestic consumption and export are estimated at about 3 per cent less than for the year 1935-1936, and 1 per cent less than for the year 1934-1935.

The report supplements a preceding report in which the bureau forecast higher prices for butter, cheese, eggs and the higher grades of cattle. Lower prices were forecast for potatoes, hogs, lambs, low grade cattle, and poultry.



Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data concerning lard is from the *New York Journal of Commerce*.



INDICATORS

Asparagus pack in California this year was 2,348,775 cases, compared to a pack in 1935 of 2,238,400 cases.

Pea pack for 1936, for Washington, Oregon, Idaho, California, Utah, Montana, Wyoming and Colorado, is estimated at 5,100,000 cases, almost exactly the same as the 5,074,809 cases produced in 1935.

Snap bean production for canning was estimated on July 13 by the Bureau of Agricultural Economics at 72,700 tons, compared to 81,300 tons produced in 1935, and an average production of 73,100 tons for the years 1928-1932.

Cucumber acreage planted for pickle manufacture in 1936 is 98,450, which is 94.9 per cent of last year's acreage, and 9,000 more acres than was planted in 1934.

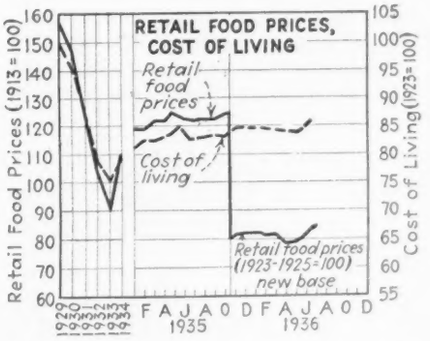
Butter stocks in cold storage, July 1, were 74,683,000 lb., compared to 96,392,000 lb. on July 1, 1935, and a five year average of 89,272,000 lb.

Shell egg stocks in cold storage, July 1, 1936, were 7,061,000 cases, compared to 7,595,000 cases a year ago, and were the smallest on record since 1920, except for 1932, when but 5,380,000 cases were on storage.

Frozen eggs held in cold storage on July 1, 1936, totaled 111,940,000 lb., compared to 107,937,000 lb. on July 1, 1935.

Meat products held in cold storage in the United States on July 1, 1936, were reported by the U. S. Department of Agriculture as 530,619,000 lb., compared to 556,033,000 lb. a year ago and a 1931-1935 average of 772,682,000 lb.

Poultry flocks as of July 1 of this year contained 11 per cent more young birds than was the case a year ago, but the drought is expected to prevent a comparable increase in the numbers of layers.



KEEPING UP WITH THE FIELD

Activities in the Food Industries—Government Rulings and Standards—Legislation and Treaties

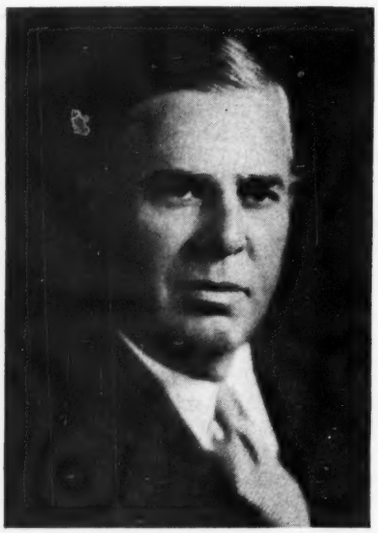
Food-Bill Fight Expected. Those who look for passage of a food and drug bill early in the next session of Congress, more than likely will be disappointed. Already a three-cornered fight on this legislation is taking shape. The new bill, which Senator Copeland and Representative Chapman say they will introduce as soon as Congress meets again, is being drafted independently of the Department of Agriculture. Since the Food & Drug Administration has definite ideas as to what a suitable food and drug law should be like, it undoubtedly will have something to say when the measure comes before the legislators. Then, of course, the food, drug and cosmetic industries will fight to protect their interests.

Bottlers Beware. From sixteen key cities of the country, agents of the Food & Drug Administration are casting an eagle eye on the actions of firms engaged in bottling orange drinks. The purpose is to prevent the use of artificial coloring in these beverages, the deadline against which practice was July 1.

The government put this restriction on the bottlers because it had evidence that diluted orange drinks, colored to resemble the genuine product, were being sold to unsuspecting consumers. The F & D A has no objection to the sale of the diluted beverage on its own merits and under true labels if it is not colored to simulate the pure product. Which means, in effect, that the sale of adulterated or imitation orange drink is forbidden.

There is a feeling in Washington that widespread enforcement of this new ruling will directly affect sales of other artificially colored foods. As for the bottling industry, it is anxious to learn just what the government will consider a proper percentage of pure orange juice in a given drink, and also the amount of pulp required. The problem is complicated by the fact that different methods of coring oranges give different amounts of pulp tissue.

Brewers Fail to Unite. United States Brewers' Association will continue as an independent organization and will not join in the movement for a unified national brewers' organization, plans for which have been drafted by a committee headed by August Busch.



NEW NCA PRESIDENT

Thomas J. Payne, vice-president of Reed Candy Co., Chicago, has been chosen to head up National Confectioners' Association. A. M. Kelly, for many years with Wallace & Co., Brooklyn, N. Y., was elected executive vice-president. Max F. Burger continues as secretary.

Behind the reasons given by the U.S.B.A. in its formal announcement of policy is believed to be a struggle between the Busch-Pabst forces and that segment of the industry lead by Col. Jacob Ruppert. Some months ago, Busch and Pabst withdrew from the U.S.B.A. and formed another organization, Brewing Industry, Inc., of which Busch is the most prominent member.

The idea back of a national organization which would represent the whole industry, particularly in combatting dry propaganda, has been warmly received by many different sections of the industry. There is a very general feeling of disappointment over the situation which has arisen.

CONVENTIONS

AUGUST

12–15—National Food Distributors' Association, Hotel Statler, Boston.

SEPTEMBER

21–23—Associated Coffee Industries of America, William Penn Hotel, Pittsburgh, Pa.

27–30—Association of Dairy, Food and Drug Officials of the United States, Gibson Hotel, Cincinnati.

28–Oct. 3—American Bakers' Association, convention and exhibit, Auditorium, Atlantic City, N. J.

To Honor Heroic Dairymen. No longer will the heroic deeds and distinguished service of men in the milk industry go unheralded. Milk Industry Foundation has struck off three medals —gold, silver and bronze—to honor those who perform the biggest, second best and runner-up exceptional services. Everyone—producers, route men, plant men, accountants, office boys, executives and who have you—is eligible to compete for the honor of receiving one of these medals. Called the Pasteur awards, they will be presented to the winners at the annual convention of International Association of Milk Dealers, and those receiving the gold and silver medals will get a free trip to Atlantic City for the ceremonies.

Freezes Canned Milk. Experiments in the condensation and freezing of milk for shipment to the Tropics and remote sections of this country where conditions are unfavorable for the production of milk and dairy products, are rapidly taking on a commercial aspect, according to prospects held out by the Bureau of Dairy Industries.

Several questions of a practical nature remain to be answered by the department experts. Among them one of the most important is the determination of the effect of the rate of freezing on milk and milk solids. Closely allied to this question is the effect the rate of freeze will have particularly upon the butter fats of milk so treated.

The process is cheap and simple. It consists of the condensation of milk by the ordinary methods now in use. The milk is pasteurized and condensed to ⅓ its weight, canned and frozen without any detrimental effects to the body or flavor.

Food in Poison Kegs. Some irresponsible processors are shipping bulk food in second-hand 15-gal. barrels which formerly contained litharge (oxide of lead) and in 30-gal. barrels formerly used for shipping fluorine and other insecticides. This is the assertion made in complaints to the Food & Drug Administration. The government is carefully watching shipments made in

containers of this type and is calling upon state and municipal authorities to take similar action. F & D A officials assert that "no amount of cleaning or coating the inside of the barrels with paraffin will render such barrels safe for food use."

Treaties Face Test. The New Deal's reciprocity treaties, to which many manufacturers have found objection, apparently will be led to court for a judgment as to their constitutionality. Though little has been said about it, there has been pending in the customs court at New York a case which may overthrow the entire structure of reciprocal trade agreements. This is the case instituted by Florida Agricultural Tariff Association, which refused to pay the low reciprocity duty on a shipment of pineapples from Cuba but insisted on paying the higher rate of the 1930-tariff schedule. The higher rate, of course, was refused, and the fight was on, just as the FATA had planned. Attorneys for FATA have submitted a preliminary brief on the case, and the government's brief is about to be filed.

Many qualified observers believe that the reciprocal treaties must fall. Their argument is that they have not been ratified by a two-thirds vote of the Senate, and hence are not valid treaties. And if they are to be considered as laws, they are unconstitutional because they have been made by the President under an unconstitutional delegation of legislative power.

Effect of Drought on Flour. Adverse weather conditions, such as have prevailed in the drought areas this summer and last, severely damage the quality of the spring wheat crop and alter its milling and baking characteristics. With this in mind, the Department of Agriculture has made some scientific studies of the low-grade grain, including baking tests. These tests have indicated that satisfactory flour can be obtained from the inferior grain, but that it has a huge ash content and an excessively high carotene content, necessitating the use of additional quantities of bleaching agents with attendant risk of injury to the product. The baking qualities of such flour were found satisfactory, except that the color of the crumb is poor. No fault was found with crust color, general appearance of the loaf or diastatic activity.

Too Many Explosions. There is still need for improvement in the prevention and control of dust explosions in grain elevators. This was a point stressed by Dr. David J. Price, Department of Agriculture, when he explained latest methods for eliminating and minimizing the damage done by explosions during a tour of the West last month. During the last five years, approximately 35 per cent of the total number of dust explosions reported in industrial and manufacturing plants occurred in grain elevators, he said. In these exploisons, 26 people were killed and 87 injured. Property losses amounted to about $3,500,000.

In regard to the food industries in general he was less critical, stating that losses from dust explosions had been reduced materially among those who have cooperated with the government in working out and adopting practical safety and preventive measures.

Borax Bath. Shippers and handlers of citrus fruit are being informed by the Department of Agriculture how to dodge stem-end rot and blue mold. The process is cheap (not more than ¾ cent per 100 lb.) and simple. It consists of giving the product a borax bath as soon as the fruit reaches the packing house. Warning is issued that delay reduces the effectiveness considerably, and firm fruit benefits more than over-ripe fruit. Best results are obtained by using a concentration of borax of not less than eight per cent, and when possible the wet fruit should be allowed to dry slowly.

Safeguard and Protect Your Product From Contamination or Spoilage by Cleaning and Sterilizing Equipment and Utensils With Dependable Oakite Material

You cannot be too careful about cleaning and sterilizing equipment and food handling surfaces. Product quality, flavor or even spoilage depends on the efficiency and thoroughness with which these daily and important operations are performed.

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In very cold weather it is advisable to raise the temperature of the fruit-rind to about 90 deg. F., before giving the bath.

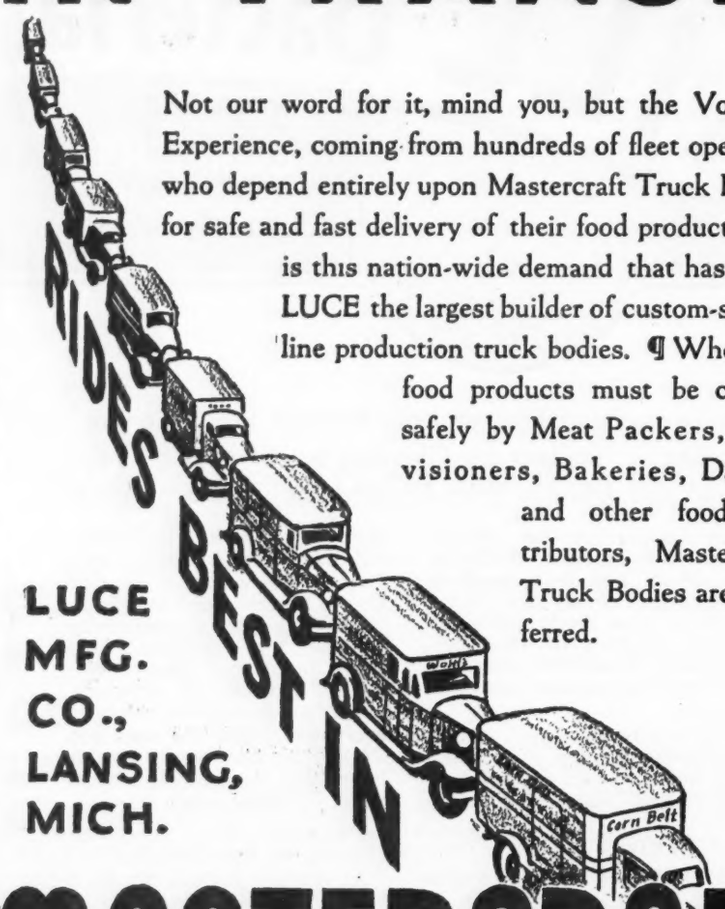
More Food Inspected. Hundreds of millions of pounds of butter, cheese and poultry, together with more than one million cases of eggs, were graded during the past fiscal year by the Bureau of Agricultural Economics to establish new records in this work. The quantity of butter graded totaled nearly 232,000,000 lb. as compared with 223,000,000 lb. the previous year. Large quantities of poultry used by canning plants were inspected, as was some full-dressed, quick-frozen poultry.

The use of certificates of quality, or grade seals, which carry the grade of butter and eggs through to the consumer, is a recent development in the grading service. The Bureau also reports further grading work on butter at concentration points, where the butter received from creameries is paid for on the basis of Federal grade and marketed as of a definite grade.

Preserving Eggs. Commercial use of the vacuum carbon-dioxide method for preserving shell eggs, recently developed by the Bureau of Chemistry and Soils is proving the solid value of the process. One firm is known to have treated several thousand cases of eggs by the method this season, and other firms are reported to be making plans for utilization of the process, as an adjunct to cold storage.

Extensive experiment has proved that the method aids in maintaining the hydrogen-ion concentration at a point below the optimum for proteolytic activity. And studies show that eggs treated by the process and then stored under normal conditions for eight months retain their condition well.

FOOD IN TRANSIT



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MASTERCRAFT TRUCK BODIES

CONCENTRATES

• Bakery executives are being urged by W. E. Long, Long Foundation of Food Research, to print on the wrapper of every loaf of bread the amount of the selling price represented by federal taxes.

• *Recently refused an injunction against the three-cent tax on coconut oil imported from the Philippines, Haskins Bros. & Co., Omaha, will carry the case to the Supreme Court.*

• In two years of operation, voluntary inspection has greatly improved the pack of canned shrimp. Three years ago, 68 shipments were seized for decomposition. But last year with 39 of 47 shrimp canneries under inspection, there were only eight seizures

• *Kentucky's new tax of 28 cents a gallon on ice cream is confiscatory and therefore unconstitutional, Circuit Judge W. B. Arderly, Paris, Ky., recently ruled in granting a temporary injunction against it.*

• Features of the Copeland Bill, the McNary-Mapes Act and the Federal Slack Fill Act are combined in a measure recently passed in Louisiana.

• *Swift & Co., Chicago, is giving vacations with pay to some 18,000 wage earners this summer. Employees of ten year's service have two weeks.*

• A four-page bulletin, No. 103, on the prevention of mold and rope in the bakery has been issued by American Society of Bakery Engineers. It covers treatment of wall surfaces.

• *Siebel Institute, Chicago, announces a ten weeks' course in baking technology, to begin Sept. 14.*

• The Fifth International Technical and Chemical Congress of Agricultural Industries will be held at Scheveningen (The Hague), July 12-17, 1937.

MEN...JOBS...AND COMPANIES

Industry

• BORDEN Co. will concentrate the manufacture of malted milk products, formerly carried on in five plants, in the Waukesha, Wis., factory.

• BORCK & STEVENS, INC., Bridgeport, Conn., contemplates a plant expansion program at a cost of $150,000.

• BOWER CITY CANNING Co., Janesville, Wis., closed for eight years, is resuming operations this month under new management. New equipment for canning corn is being installed.

• CALIFORNIA MARINE CURING & PACKING Co. recently increased the capacity of its plant at Terminal Island to 2,500 cases daily.

• CARNATION MILK Co. will erect a $30,000 milk receiving station at Rushville, Ohio.

• CUSHMAN'S SONS, INC., is spending $150,000 to enlarge its plant at Lynn, Mass. New equipment is being installed.

• ELIE SHEETZ CANDY Co., Washington, D. C., is changing its name to Martha Washington Candy Co.

• GENERAL FOODS CORP., through its Post products division, will erect two new buildings at Battle Creek, Mich., at a cost of $1,500,000.

• GENERAL ICE CREAM Co. will build a modern plant costing more than $100,000 at Rochester, N. Y.

• HEIM PACKING Co. recently opened a sausage manufacturing plant at Houston, Texas.

• HYGRADE SODA WATER Co., St. Louis, is constructing a two-story, 45x149-ft. addition to its plant.

• IGLEHEART BROS., INC., Evansville Ind., announces the purchase of Collins Flour Mill, Pendleton, Ore. Located in the soft-wheat growing section, this plant will enable Igleheart to distribute soft-wheat flour on a competitive basis with other mills.

• KRAFT-PHENIX CHEESE CORP. recently acquired Tuttle Cheese Co., Oakland, Calif., and it also is enlarging its plants at San Francisco and at Pocatello, Idaho.

• KENNEDY DAIRY Co. will erect a modern dairy at Huntington, W. Va.

GLENN C. HOSKINS

He returned to Foulds Milling Co., Libertyville, Ill., on July 1 to become vice-president and general manager and to supervise production for Grocery Store Products, Inc., of which Foulds Milling Co. is a subsidiary

• KROGER GROCERY & BAKING Co. plans a $240,000 modernization program in Cleveland and will build a $175,000 modern warehouse in Peoria.

• LADISH-STOPPENBACH MALTING Co. suffered a loss of more than $150,000 on July 2 when a shipping warehouse was destroyed by fire.

• OCEANA CANNING Co., Shelby, Mich., is cooperating with Continental Can Co. in the development of new uses for cherry juices.

• PURITY BISCUIT Co., Salt Lake City, will spend about $200,000 to expand production facilities.

• QUAKER OATS Co., Chicago, recently acquired a patent for cooking and extruding cereal products in plastic form.

• MARATHON COOPERATIVE DAIRY, Wausau, Wis., is embarking on an $80,000 plant improvement program to include equipment for manufacturing butter and powdered milk.

• JOHN MORRELL & Co. will make an addition to its plant at Ottumwa.

• REID, MURDOCH & Co. is establishing a distributing branch in Houston, Texas.

• STONE DWYER Co., Morgan City, La., will pack fresh frozen shrimp and crabmeat. New equipment is now being installed.

• STROEHMANN & BROS. Co., Harrisburg, Pa., recently bought the equipment and the property of Petra Baking Co., Olean, N. Y.

• SWIFT & Co., Chicago, recently sold its interest in United Stockyards Corp. for $10,000,000. Swift & Co. is locating a cheese factory at Batesville, Miss.

• WHITE BAKING Co., Dayton, Ohio, will expand its production facilities by constructing a $40,000 addition to its plant. New equipment will be installed at an additional cost.

• WILLIAMS & CARLTON TEAS, COFFEE & EXTRACT Co., Hartford, Conn., will merge with Delano, Potter Co., Boston, and will move its plant to Boston.

• WILSON & Co., Chicago, has established a plant for processing eggs at Atchison, Kans.

Personnel

• C. C. BRICK, Brillion, Wis., president of Manitowoc County Cheesemakers' Association, has been elected president of Wisconsin Cheese Publicity Association.

• JOHN M. CHAPLIN, comptroller of Swift & Co., has been elected consulting comptroller, with J. G. Smithwick becoming comptroller.

• HENRY S. COX now heads up Society of Grain Elevator Superintendents of North America. He is with the Rialto elevator, Chicago.

• HAROLD DANIELSON has been appointed by Armour & Co. to supervise operations at its Mason City plant.

F. G. DUFFIELD recently became general manager of the Armour & Co. plant at Mason City to succeed E. E. Evans.

• LON P. FLANIGAN, Geneva, N. Y., recently was re-elected president of National Kraut Packers' Association. Roy L. Irons, Clyde, Ohio, was named secretary-treasurer for the fifth consecutive term.

• F. D. GALLAGHER is a new director of Booth Fisheries Corp.

• J. L. GESSER is the new manager of General Baking Co.'s plant at Indianapolis. Previously manager of the

firm's Auburn, N. Y., plant, he succeeds O. D. Durbin, transferred to Buffalo, N. Y.

• FRED GUNNING succeeds Edward C. Kenny as manager of the Buffalo branch of Booth Fisheries Corp.

• JAMES D. HART, Fall River, Mass., has been elected president of National Confectionery Salesmen's Association of America.

• B. R. JACOBS, Washington representative and head of the research laboratory of National Macaroni Manufacturers' Association, has moved his headquarters to Brooklyn, N. Y.

• J. W. KENEHAN has left Standard Brands, Inc., to become an executive with American Products Co., Fort Worth, Tex.

• H. B. LAWTON has succeeded W. T. Brady as manager of the Edgewater plant of Corn Products Refining Co., Mr. Brady having been moved to Chicago. J. W. Power, superintendent of the Argo plant at Chicago, relieves Mr. Lawton as manager of the Pekin plant, while Frank Glotfelty, former division superintendent at the Argo plant, will take over the duties of Mr. Power as superintendent at Argo.

• G. P. MERRILL, formerly with Richard Hellman and Best Foods, recently became production manager of Hills Bros., Brooklyn, N. Y.

• WALTER MOLLOY is the new president of the Oregon chapter of American Society of Bakery Engineers. He is with Cherry City Baking Co., Salem.

• EDWARD C. RITTER becomes general manager of the Boston division of General Baking Co. He had been general manager at Buffalo, where he is succeeded by Donald Durbin, plant manager at Indianapolis.

• DR. J. R. SANBORN has left Arthur D. Little, Inc., to engage in consultation work and research in industrial microbiology. His laboratories are at International Paper Co., Glens Falls, N. Y.

• HAROLD G. STEVENS, Bridgeport, is now president of New England Bakers' Association.

• W. C. WILLUMSEN has been elected vice-president of Cary Maple Sugar Co., Inc., St. Johnsbury, Vt. He had been manager of the company's Chicago division.

• W. G. WOLF has been appointed plant superintendent by Siren Mills Corp., Chicago, and R. W. Gruver has been made traffic manager.

• CHESTER W. WOOD has retired as manager of Swift & Co.'s New Brunswick branch, a position which he held for 43 years. Arthur Heinz takes over his duties.

• C. E. WOODY has been promoted from assistant general manager to general manager of Wisconsin Cooperative Milk Pool, Oshkosh.

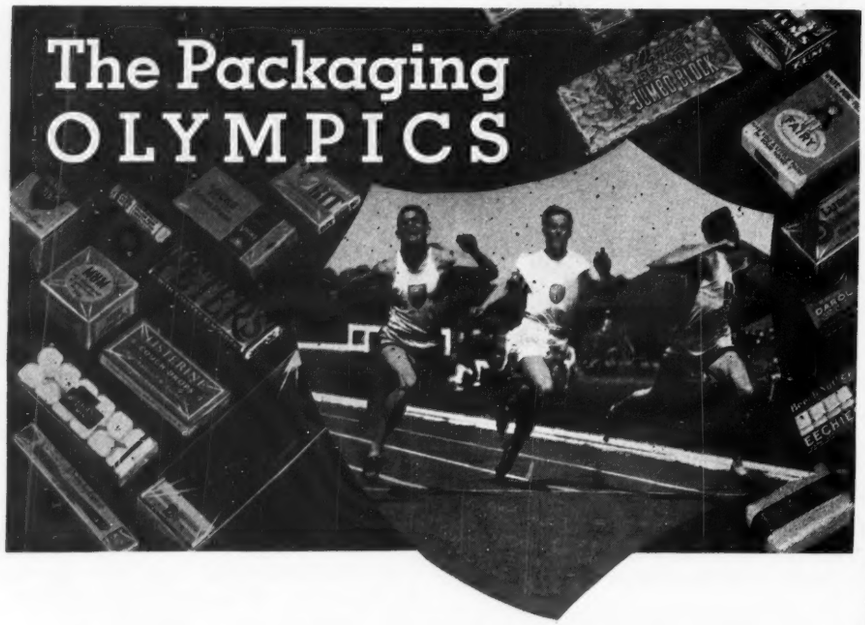
Deaths

• FREDERICK A. ELLARD, assistant manager of Whiting Milk Co., Boston, July 5.

• ASA B. GARDINER, 70, for 30 years engaged in the milk distributing business in Baltimore, June 25.

• W. E. HOFFMAN, founder of the Alexandria, Pa., ice cream company bearing his name, now a subsidiary of National Dairy Products Corp., recently.

• HARRY D. HUNT, 63, general superindent of Cudahy Bros. Packing Co., Milwaukee, July 7.



Competition in the Olympics may be stiff, but it hasn't anything on the competition in the package goods field . . . And, like the the Olympic victors, the packages that come out ahead are those that have "what it takes"—what it takes to make sales.

You can secure new sales advantages for your package without changing its well-known characteristics. There are numerous ways of giving a package a finer appearance, greater convenience to the user, better protection for the product, without altering its basic design.

A large percentage of our machines are bought to carry out package improvements. The great versatility of these machines —the wide variety of materials they can handle, and the many styles of wrapping they can make—offers unlimited possibilities for creating new and outstanding packages.

We will be glad to offer suggestions.

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PACKAGE MACHINERY COMPANY
Over 200 Million Packages per day are wrapped on our Machines

• JOHN W. KNOBBE, 70, owner of Walworth (Wis.) Condensed Milk Co. and past president of International Association of Ice Cream Manufacturers, recently.

• HARRY G. MILLS, 50, vice-president and director of Armour & Co., at New York, July 16.

• GEORGE W. ORDWAY, 80, long a leading figure in the spring water business at Providence, R. I., June 24.

• MILTON C. NELLIS, former tomato packer at Brazil, Ind., recently.

• PERCY D. PARKS, 62, for 31 yars assistant to the vice-president of United Fruit Co., at New Orleans, June 20.

• WILLIAM F. SCHAFER, 80, president of Chilton (Wis.) Canning Co., June 23.

• LEONARD A. SLAVIN, for several years assistant manager of the New York office of National Biscuit Co., July 3.

• PAUL STEELE, vice-president and sales manager of Wesgate Sea Products Co., San Diego, Calif., June 28.

• HARRY W. STEGALL, 61, president of Union Biscuit Co., St. Louis, and a director of United Biscuit Co. of America, recently.

• SIDNEY B. STEVENS, 72, retired executive vice-president of Reid, Murdoch & Co., Chicago, recently.

• LOUIS A. WELDMAN, 63, for a number of years operator of a baking plant at East Orange, N. J., July 14.

Associated Industries

• CONTINENTAL CAN CO., INC., New York, has appointed F. Gladden Searle general manager of sales to succeed his brother, the late Thaddeus B. Searle.

• COPPUS ENGINEERING CORP. has named the C. W. Cotton Co., Tulsa, agents in the state of Oklahoma and the Texas Panhandle.

• CREAMERY PACKAGE MANUFACTURING Co. has placed F. E. Newlander over its Eastern Tennessee territory and Henry Baker over the Georgia territory.

• EDWARD ERMOLD CO. announces the election of Watson A. Guthrie to the presidency to succeed the late Edward Ermold.

• LINCOLN ELECTRIC CO. has appointed Intermountain Belting & Packing Co. its agent in Denver, Colo.

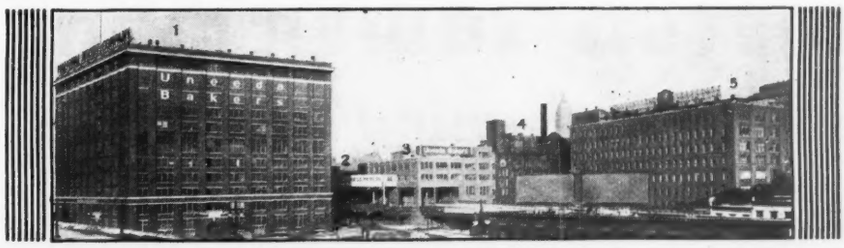
• PATTERSON FOUNDRY & MACHINE CO. recently purchased the ball grinder and mixer business of A. & F. Brown Co.

• REPUBLIC STEEL CORP. has appointed as distributors of its stainless steel, Conner Manufacturing Co., Louisville, and Chas. Millar & Son Co., Utica, N. Y. The company also announces the appointment of Taylor-Parker Co., Inc., Norfolk, distributor of tubular products.

• STEPHENS-ADAMSON MANUFACTURING Co. announces appointment of F. E. Dunlap as branch manager in charge of conveyor sales and engineering in Michigan.

• C. J. TAGLIABUE MANUFACTURING Co., Brooklyn, N. Y., has promoted A. F. Rucks to general manager.

• WESTINGHOUSE ELECTRIC & MANUFACTURING Co. is transferring the manufacture of small motors from its Springfield plant to Lima, Ohio. This will permit expansion of production facilities for refrigeration and air conditioning units.



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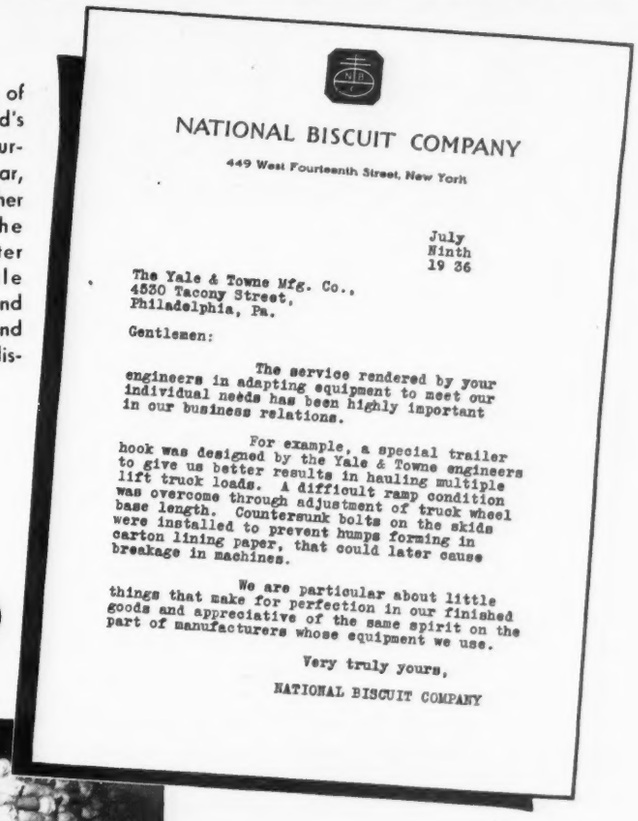
YALE TRUCKS-YALE SERVICE

It takes keen judges of value to be the world's largest consumer-purchasers of flour, sugar, butter, eggs and other baking items. The accompanying letter explains why Yale Hand Lift Trucks and Skid Platforms stand the test of these discriminating buyers.



NATIONAL BISCUIT COMPANY
449 West Fourteenth Street, New York

July
Ninth
19 36

The Yale & Towne Mfg. Co.,
4530 Tacony Street,
Philadelphia, Pa.

Gentlemen:

The service rendered by your engineers in adapting equipment to meet our individual needs has been highly important in our business relations.

For example, a special trailer hook was designed by the Yale & Towne engineers to give us better results in hauling multiple lift truck loads. A difficult ramp condition was overcome through adjustment of truck wheel base length. Countersunk bolts on the skids were installed to prevent humps forming in carton lining paper, that could later cause breakage in machines.

We are particular about little things that make for perfection in our finished goods and appreciative of the same spirit on the part of manufacturers whose equipment we use.

Very truly yours,
NATIONAL BISCUIT COMPANY

YALE

THE YALE & TOWNE MFG. CO.
Philadelphia Division Philadelphia, Pa., U. S. A.

Paradoxes of Quality Control

(*Continued from page 395*)

Propionic acid has an odor resembling that of acetic acid and is responsible for the characteristic flavor of well-cured Swiss cheese. This acid also is present either in small amounts or as a trace in all good lactic bacterial cultures for ripening cream used in the manufacture of butter. Also it is found in fermented milk along with the acetic acid which is always present in small amounts.

Butyric acid occurs in the butterfat in the form of glycerine butyrate or the butyric ester of glycerine. If the combination known as butterfat is broken up, the butyric acid comes loose and is responsible for the strong bitter flavor found to occur when sweet cream has not been permitted to sour naturally. It is generally associated with oxidation. One of the problems which confronts the market milk industry is the development of a bitter taste and rancid odor in fresh, sweet cream. It occurs at a time when it would not be expected to take place, for it is usually found in the fall and winter months. It is characterized by an unexpected increase in acidity when the cold, sweet, raw cream is held in storage at low temperatures.

Although the foregoing increase in acidity is not caused by lactic acid, the analysis is calculated as though it were actually lactic acid. And it sometimes increases as much as 0.06 per cent when fresh, raw cream is held 24 hours at 40 deg. F., a temperature that would be expected to prevent any such change.

The foregoing defects in the cream have been traced to high chloride content of the milk, associated with lipase (a fat-splitting enzyme) activity, resulting in the formation of traces of butyric acid. While the bitter flavor, developed in this manner, is often referred to as an "oxidized flavor," accurately speaking it is the result of hydrolysis—the actual chemical breakdown of fat.

However, a defect which is the result of oxidation is found in the development of tallowy flavors in market milk. Flavor defects of this type have been observed more often in winter than in summer. It occurs in sweet milk having extremely low bacterial counts and has proved to be a problem to many dairies. But in some instances it has been satisfactorily solved *by inoculating such milk with cultures of lactic acid bacteria.* The principle involved is that these bacteria possess reducing properties that are sufficiently anti-oxidative to successfully offset the oxidative influences in the milk.

From the foregoing account, it is evident why sour cream has advantages in the manufacture of creamery butter. An interesting and illuminating fact is that the temperature range which has been found desirable by the University of Illinois for cream to be used in buttermaking—namely, 60 to 70 deg. F.—practically coincides with the temperatures which have been established by recognized authorities as ideal in the propagation of all good quality butter cultures or starters. Thus, sour cream produced under those conditions of temperature control which have been found most desirable for good butter cultures can be expected to be superior for the raw material to be used in the manufacture of creamery butter and experience will doubtlessly justify this prediction.

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switches cleaning TO SAFETY

THE man in the tower's always on the job! In your cleaning, you can be sure of this same kind of control for safety. Use Metso, sodium metasilicate, the newest balanced-action alkali.

Metso has high powered cleaning strength which quickly removes all grease, oil and dirt. But that's not enough for you. You have expensive containers and equipment to protect.

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Does your cleaner take off more than dirt? Try Metso. It costs no more.

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METSO CLEANERS

Atmospheric Control Cuts Costs

(*Continued from page 387*)

pany at Newark, N. J., or Molson's Brewery at Montreal, Canada, as examples. Most fermenting tanks are open at the top and, furthermore, ale fermentation is a top fermentation.

This means that most of the yeast is at or close to the top of the fermenting wort. And anything that affects the surface will affect yeast, and in turn it will affect the fermentation.

Temperature, of course, must be just right. Then the air must have the correct humidity or the yeast will be affected. Furthermore, the rate of air motion across the top of the open fermenters is very important.

One other feature of ale brewing that makes complete air conditioning important is the relatively higher temperature of the ale fermenting room compared to the beer fermenting room. At lower temperatures, accidental contamination is less of a technical hazard than at the higher temperatures. Beer is usually fermented at about 40 deg. F., while ale is usually fermented at temperatures in the vicinity of 50 deg. F. Ale brewers, however, vary their temperatures as part of the process and regard the exact figures as a trade secret.

Many ale brewers try to get the rate of air motion as close to 6 ft. per minute as possible. Higher rates up to about 12 ft. per minute seem to be permissible, but anything faster is usually considered bad.

Another reason for close atmospheric control in ale fermenting cellars is to avoid drying out of wood tanks or tubs.

Still other benefits are freedom from any possible ceiling drip. Any water condensing on the ceiling may be contaminated by bacteria, mold or wild yeast, in spite of all other possible precautions. If it should drip back into an open tank, the contents of the tank would be contaminated, and an otherwise pure culture fermentation might be ruined. Any contamination of ale would involve a very considerable loss of quality.

Of course, the air conditioning apparatus will remove the carbon dioxide that spills over the tops of the fermenting tanks. Feigenspan keeps the CO_2 down to $1\frac{1}{2}$ per cent in the room, while Molson's Brewery keeps it at 2 to 3 per cent at the height of one's head.

Atmospheric control at one brewing plant also has permitted the use of basement storage cellars for the efficient storage of stock ale.

A few breweries possess ths necessary knowledge and ability to utilize the best methods and equipment available today. Others know what they want but lack funds with which to purchase it. Still others cling steadfastly to traditions. Nevertheless, atmospheric control in the brewery is a long step toward freedom from contamination and off-quality products.

Malt as an Ingredient

(*Continued from page 397*)

cost. A product such as bread offers no problem, as the syrup is ideal for direct blending in the dough mixer. Even here, the powdered grades are used to some extent and often the syrup is diluted with water.

Revolving rolls offer a means of applying malt to flakes, or, since the quantity applied may be regulated by the dilution, a spray nozzle may be the desirable means. Powdered extract may be dusted on, mixed in dry, or blended with almost any consistency product, and as far as compounding goes, it is the most versatile of the available forms.

A Famous Package for a Famous Dog Food

SPRATT'S PATENT LTD. CHOOSES *THE S&S TIGHT-WRAPPED PACKAGE*

FROM A RECENT LETTER

"Incidentally, your machine seems to have justified its existence in our factory in the elimination of insect infestation to a point where complaints on these packages are practically negligible.

with best wishes,
Yours Faithfully,
SPRATT'S PATENT (AMERICA) LIMITED
L. M. Buckle, Gen. Mgr."

S & S Tight-Wrapped Packages have solved many problems for many users. • Attractive and economical they give extra protection, are easily handled and non-sifting. Brilliantly varnished labels, even labels of glistening metal are now available for still greater protection, still finer appearance. • A sample of your product, mailed to Stokes & Smith Co., will bring you complete data on how S&S Tight-Wrapping may be applied to your own packaging problems.

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BOOKS RECEIVED

THE STORY OF THE CANNING INDUSTRY. Published by National Canners Association, Washington, D. C., 1936. 16 pp, 6x9 in. paper. Free.

A helpful feature of this booklet on the development of the canning industry is its list of references to literature on history of the industry, canning methods, canning crops, production of canned foods, marketing and distribution, foreign trade, prices, employment, public health aspects of canned foods, standards, grades and labels, nutritive value of canned foods, and canning trade journals now published.

LEGAL PROTECTION OF GOOD WILL. By Frank S. Moore. Published by Ronald Press Co., 15 East 26th St., New York, N. Y., 1936. 2181 pp., 6x8½ in., cloth. Price $3.50.

Establishing or protecting good-will rights is a matter of concern to every business man. Like nearly every other factor in corporate relationships, good-will rights are subject to the principles of property laws and should be given careful study under expert guidance.

In this book the author discusses trademarks, how to obtain title to a trademark, and how to protect against infringement or loss due to negligence.

CORROSION RESISTANCE OF METALS AND ALLOYS. By Robert J. McKay and Robert Worthington. Published by Reinhold Publishing Corp., 330 West 42d St., New York, N. Y., 1936. 492 pp., 6½x9¼ in., cloth, illustrated. Price $7.

Corrosion is a problem in the production of nearly all food products Data given in this treatise deals largely with facts which should be helpful to technical workers in the selection of the right metal or alloy for the intended use. This data has been compiled from publications and files of the metal industries throughout the United States. Rate factors, forms of corrosion, corrosives and corrosion properties of metals are discussed as well as is the corrosion behavior of specific metal and alloy groups.

The treatise is No. 71 of the American Chemical Society series of scientific and technologic monographs.

TEA AND COFFEE BUYERS' GUIDE. Published by Tea and Coffee Trade Journal Company, 79 Wall St., New York, N. Y. 1936. 264 pp. 4⅞x7½ in. paper. Price $2.

In its eighth edition this standard reference manual of the tea, coffee, and allied trades contains the new features, "Coffee in the Producing Countries," "Tea in the Producing Countries," "Selected List of Tea and Coffee Importers, Wholesalers and Brokers in the Principal Consuming Countries."

100 HONEY HELPINGS. Published by American Honey Institute, Madison, Wis. 32 pp., 5½x8⅜ in. Paper. Free.

FOR MILLERS IN THE MAKING. Published by Miller Publishing Co., 118 South Sixth St., Minneapolis, Minn. 1936. 104 pp., 6x9 in., paper; illustrated. Price 50 cents.

Subject matter and drawings presented in handbook form first appeared as a series of short articles in the Milling Production department of the *Northwestern Miller*. All steps in the conversion of grain to final end products are discussed briefly with sketches showing course of material through the mill and the location and relationship of equipment units used.

THE HANDBOOK OF FOOD SELLING. By Alexander Todorff. Published by The Grocery Trade Publishing House, 755 N. Central Ave., Chicago, Ill. 1935. 64 pp., 5x7½ in., paper, illustrated. Price 50 cents.

MUTTON AND LAMB SURVEY. Summary of production and trade in the British Empire and foreign countries prepared by the Intelligence Branch of the Imperial Economic Committee. Published by His Majesty's Stationery Office, London. 1935. 294 pp.; 7¼x9⅝ in., paper, illustrated. Price, $1.20. Obtainable from British Library of Information, 270 Madison Ave., New York, N. Y.

PATENTS

Fish Cut Into Desired Lengths and Fed Into Cans by Mechanical Means—Walter E. Rooney, Bellingham, Wash. to American Can Co., New York, N. Y. No. 2,044,813. June 23, 1936.

Bread Mechanically Sliced by Circular Saws—Harry J. Criner, Davenport, Ia., to The Micro Corporation, Bettendorf, Ia. No. 2,044,835. June 23, 1936.

Ham Cut to Remove Hip Bone and Smoked with Cut Surface Protected to Prevent Undue Drying—Hugo Fredberg and Carl Fredberg, Chicago, Ill. No. 2,044,841. June 23, 1936.

Starch, Sugar and Flavoring Material Put Into Cake Form for Marketing as a Dessert Preparation—Heinz G. Lorenzen to Kitchen Art Foods, Inc., Chicago, Ill. No. 2,045,019. June 23, 1936.

Liquid Milk Passed Over an Absorptive Surface Impregnated With a Hydroxyl-ion-Yielding Electrolyte and an Alkali Metal Salt for the Reduction in Proportions of Calcium and Phosphate Ions in the Milk—Herbert E. Otting, Westerville, Ohio, to the M. & R. Dietetic Laboratories, Inc., No. 2,045,097. June 23, 1936.

Bread Dough Portions Shaped Into Disk Form and Panned on Edge for Baking as a Composite Loaf—Laurence Seymour Harber and John Edward Pointon, Peterborough, England, to Baker-Perkins Co., Inc., Saginaw, Mich. No. 2,045,228. June 23, 1936.

Roasted Coffee, Almonds, Cocoa Beans and Peanuts Cooled by Passing in Thin Layer Through Which Is Blown Current of Chilled Air—Lawrence K. Watrous, Shafer, Minn. No. 2,045,319. June 23, 1936.

Coffee Freed From "Silver Skin" Before Roasting—Fernando Falla, Milburn Township, Essex County, N. J. No. 2,045,591. June 30, 1936.

Cone-Shaped Confections Formed by Lining Only a Portion of Mold With a Layer of Protective Material and Removing the Frozen Confection and the Protective Wrapping From the Mold to Leave a Portion of the Frozen Confection Extended Beyond the Protective Wrapping and for Insertion Into an Edible Holder—George W. Schepman and ,William W. Merydith, Detroit, Mich. No. 2,045,730. June 30, 1936.

Eggs Packaged in Pocketed Cartons by Mechanical Means—Frederick G. Funk, Chicago, Ill. No. 2,045,767. June 30, 1936.

Malt and Milk or Cream in Liquid State Churned Together to Form Solid Product Having a Butterlike Texture—William P. Kesel, Valley Stream, N. Y. No. 2,045,782. June 30, 1936.

Coffee Decaffeinated by Passing Electric Current Through an Electrolyte Solution in which the Beans Are Submerged—Walter F. Hoffman, to The Northwest Paper Co., Cloquet, Minn. No. 2,045,854. June 30, 1936.

Juice Pressed From Pulped Pineapple Meat With the Help of a Filter Aid—Simes T. Hoyt, and Richard M. Botley to Hawaiian Pineapple Co., Ltd., Honolulu, T. H. No. 2,045,856. June 30, 1936.

Method of Preparing Meat and Fish Extracts—Kiyonobu Hatta Shayoku, Kyotto, Japan. No. 2,045,949. June 30, 1936.

Roasted Coffee Stabilized by Use of Inert Gas While Beans Are Still Hot From Roaster, and During Cooling and Grinding Operations—Herbert C. Gore, Scarsdale, Quick Landis, New York, and Charles N. Frey, Scarsdale to Standard Brands, Inc., New York, N. Y. No. 2,046,158. June 30, 1936.

Fat- and Oil-Containing Products Protected Against Rancidity by Transparent Cellulose Wrapping Material Having a Color Selected From the Yellow, Orange and Red Group—Willard L. Morgan, Nutley, N. J., to Sylvania Industrial Corp., Fredericksburg, Va. No. 2,043,860. June 9, 1936.

Insecticidal Residues Removed From Fruits and Vegetables by Washing With a Water Solution of a Mineral Acid and an Aluminum or Ferric Salt—Roscoe H. Carter, Washington, D. C., to the Public of the United States of America. Nos. 2,046,546 and 2,046,547. July 7, 1936.

Insecticidal Residues Removed From Fruits and Vegetables by Washing in a Solution of Boric Acid With a Mineral Acid Such as Hydrochloric or Sulphuric—Roscoe H. Carter and Jack E. Fahey, Washington, D. C., to the Public of the United States of America. No. 2,046,548. July 7, 1936.

Sugar Flavor-Carrying Material Made by Dissolving Dextrose Hydrate in Water, Concentrating, Cooling to Below 98 Deg. F. and Crystallizing With Agitation to Form Hard Brittle Mass With a Liquid Phase and a High Solid Content—Albert Adams Lund, Port Washington, N. Y., to Royal Baking Powder Company, New York, N. Y. No. 2,046,567. July 7, 1936.

Calcium Acid Lactate Prepared to Contain Four Lactate Groups for Each Calcium Atom and to Be Crystalline, Soluble in Water, Methyl Alcohol, Acetone and Glacial Acetic Acid and to Have a Melting Point of at least 153 eg. C.—Julian K. Gale, Kew Gardens, N. Y., to Royal Baking Powder Company, New York, N. Y. No. 2,046,610. July 7, 1936.

Bowl-and-Beater-Type Mixer Fitted With an Electrically-Heated Water Bath for Base of Bowl—Conrad B. Krause, Cleveland, Ohio. No. 2,046,784. July 7, 1936.

Biscuits Removed From Baking Pans by Mechanical Means—Robert French MacFarlane, Osterley, England, to Baker Perkins Company, Inc., Saginaw, Mich. No. 2,046,832. July 7, 1936.

Crystalline Dextrose Containing One Molecule of Water of Crystallization Pressed Into Tablet Form Readily Broken Up and Dissolved in Water—Heinrich Meyer, Barby-Elbe, Germany, to International Patent Development Company, Wilmington, Del. No. 2,046,833. July 7, 1936.

Celery Salt Comprised Largely of Sodium Chloride and Lesser Quantities of Celery Oil and Mono-Sodium Glutamate—Hugh E. Allen, one-half to Albert G. McCaleb, Evanston, Ill. No. 2,046,862. July 7, 1936.

Beer Barrel Fitted With an Exterior Jacket One End of Which is a Double Wall Compartment for Holding Supply of Solid CO_2 Refrigerant and Fittings for Tap Connections to a Dispenser Container—John L. Kellogg to Helen L. Kellogg, Chicago, Ill. No. 2,046,953. July 7, 1936.